The Journal

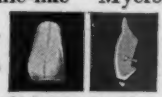
OF THE

AMERICAN DENTAL ASSOCIATION

Can You Restore Teeth Like These?

You will find the most faithful duplication of nature's wonderful patterns in Dr. Myerson's True-Blend. Dr. Myerson's teeth capture the life-like characteristics of natural teeth . . . with subtle simulations of stains and transparent effects, they are vibrant with life-like beauty.

For greater naturalness specify Dr. Myerson's True-Blend. For security in processing and efficiency in use, use True-Kusp posteriors with them.



Light Transmission does it

Dr. Myerson's

TRUE-BLEND ANTERIORS • TRUE-KUSP POSTERIORS

IDEAL TOOTH INCORPORATED, CAMBRIDGE 39, MASS.

The Journal of the American Dental Association, Vol. 32, No. 5. Published by the American Dental Association, 222 E. Superior St., Chicago 11, Ill. Yearly subscription $5.00. Single copy fifty cents. Entered as second-class matter, May 27, 1942, at the postoffice at Chicago, Ill., under the act of August 24, 1912. Published semimonthly.
Copyright 1945 by the American Dental Association.

THE JOURNAL
of the
AMERICAN DENTAL ASSOCIATION

Vol. 32 MARCH 1, 1945 No. 5

EXPOSURE OF UNERUPTED UPPER CUSPIDS FOR ORTHODONTIC PURPOSES*

C. D. GWINN, D.D.S., San Francisco, Calif.

THE upper cuspid fails to erupt or is found to be impacted more frequently than any other tooth, with the exception of the lower and upper third molars. The impacted third molars, both upper and lower, although of great concern to the orthodontist, usually are not of importance until the case is nearing completion or has been completed. The upper cuspid erupts at an age when orthodontic correction is most often carried out. Its failure to erupt or its impaction becomes an orthodontic problem and one that must be met during the course of the work.

EARLIER METHODS

Years ago, it was the practice of oral surgeons cooperating with orthodontists to expose the crown of the unerupted tooth partially, drill a small hole through the enamel into the dentin in some accessible spot and cement in this hole a small hook by means of which traction could be applied to the tooth. The tendency for decay to occur around the hook, the necessity of placing a filling after the removal of the hook and, most of all, the occasional death of the pulp, due to exposure in drilling the hole, led to a search for some other method of procedure.

BENNETT METHOD

About six years ago, the orthodontic department of the University of California College of Dentistry called attention to the work being done by George Bennett of Tucson, Ariz., for orthodontic patients of Charles H. Tweed, also of that city. Through correspondence, we learned from Dr. Bennett some of the particulars of his method of treating these cases. The overlying soft tissue and bone were removed, the crown of the unerupted tooth being exposed as much as possible. Guttapercha was then packed between the bony wall of the crypt and the crown of the tooth, and was kept in place for several days. Dr. Bennett

*From the Division of Dental Surgery, College of Dentistry, University of California.

found that, once freed of the overlying thick fibrous gum tissue and aided by some pressure from the guttapercha, these teeth quickly began to move down, and soon appliances could be attached to them by the orthodontist.

STROCK'S METHOD

It was not until several years later that an article written by M. S. Strock,[1] of Boston, was read. Dr. Strock's method differs somewhat from that of Dr. Bennett. The crown of the unerupted tooth is first exposed as much as possible. A celluloid tooth form is then fitted over it, being trimmed as necessary. After being fitted properly, this celluloid form is filled with a paste made of camphor, metacresol, petrolatum, white wax and lanolin, and forced gently over the tooth crown. This paste, which hardens and holds the form in place, is changed every week for about a month. At this time, it is decided whether the tooth will continue to come down or it will require the attachment of an orthodontic appliance.

Fig. 1.—Cuspid, unerupted, in L. S., aged 13; September 16, 1942.

AUTHOR'S METHOD

At the request of the orthodontic division, I have exposed a number of these teeth during the past six years. The technic of exposure followed that of Bennett and also of Strock, but differed slightly from each. No guttapercha was packed between the crypt wall and the crown of the unerupted tooth as in Bennett's method, nor was any celluloid tooth form fitted over the crown of the tooth as in Strock's method.

ANESTHESIA

Several of the cases were carried out under nitrous oxide-oxygen anesthesia, but most of the patients tolerated very well a local anesthetic, the anesthetic of choice for this work whenever possible. The use of pentobarbital sodium preoperatively reduced apprehension considerably. The age range of the patients was from 12 to 17 years.

Fig. 2.—Cuspid, erupted, rotation not completed, in L. S.; August 19, 1943.

DETERMINING LOCATION OF THE UNERUPTED TOOTH

A careful study of properly taken x-ray films is essential. The deciduous cuspid, when still in place, was extracted first. A sharp explorer was then used to

1. Strock, M. S.: New Approach to Unerupted Tooth by Surgery and Orthodontics. Am. J. Orthodontics, 24:626, July 1938.

probe through the socket and locate the crown of the cuspid. If the deciduous cuspid had been lost, careful palpation of the labial and lingual tissue together with a study of the inclination of the lateral incisor was usually sufficient to locate the tooth labially or lingually. If the tooth is placed high up, toward the apices of the lateral and central incisors, stereoroentgenograms may be used to assist in its location.

The crowns of most of these unerupted cuspids will be found either above the root of the deciduous cuspid or toward the lingual aspect. Occasionally, the permanent cuspid is placed labially. When this occurs, the root of the lateral incisor usually is inclined lingually and a distinct bulging of the labial plate may be felt by palpation, marking the location of the crown of the unerupted tooth. The exception to this is found when the cuspid is placed high on the labial aspect above the root of the lateral incisor. The depth to which the tooth is buried and the thickness of the soft tissue high in the reflection area make it difficult to detect any bulging of the labial plate. Attempts to bring down the only two of this type encountered in this series have been unsuccessful. When the permanent cuspid is deeply placed in the palate and its incisal edge is directed against the root of the lateral incisor, success in efforts to cause it to erupt have been limited. There was one failure in this type in this series.

It may well be that in both of the foregoing types, failure was due to inability to expose and maintain exposure rather than to the method.

Fig. 3.—Unerupted cuspid in J. W., aged 14; September 30, 1939. Cystic degeneration of the enamel sac is apparent.

Fig. 4.—Cuspid in place, with no evidence of cystic degeneration, in J. W.; July 29, 1943.

TECHNIC OF OPERATION

The deciduous cuspid, if present, is extracted. As mentioned above, if the operator is sure of the location of the crown of the permanent cuspid, a sharp pointed explorer is used to probe through the socket of the extracted tooth to find it. Usually, the enamel sac of the permanent tooth will be against the root of the deciduous tooth at one point or another. Once this is found, the explorer can be used to determine the general direction of the crown.

An oval incision is made through the gum tissue over the area where the crown of the tooth has been located. Care should be taken to preserve the lingual gingival tissue of the central and lateral incisors. The incision, while it follows somewhat the shape of the crown of the unerupted tooth, should include enough area so that when the button of tissue is removed, the opening will be larger than the crown of the tooth. This is necessary because of a tendency of the tissue to proliferate and heal over these openings if they are too small. A sharp broad chisel may be used to separate and remove the fibrous gum tissue included by the incision.

Usually, one or two bleeding points will be found in the margin of the incision if made in the roof of the mouth. The most constant one of these is in the posterior region. Here, bleeding is caused by cutting one of the branches of the descending palatine artery. The other bleeding point, which is found anteriorly, is probably also from one of

Fig. 5.—Case of B. E., aged 13; February 12, 1942.

Fig. 7.—Cuspid high in region of apex of lateral incisor in J. B., aged 12; February 10, 1940.

Fig. 6.—Case of B. E.; February 24, 1944.

Fig. 8.—Cuspid in place in case of J. B.; May 24, 1943. The lateral incisor has shifted, but is vital.

the branches of the same artery, or possibly one from the opposite side. It is necessary to suture these bleeding points before proceeding with the operation. It has been the practice merely to pass a suture from the surface on one side of the bleeding point and about 2 mm. from the edge to the bone at the margin of the incision, turning the needle around and passing it back on the other side of the bleeding point, entering it next to the bone and causing it to emerge on the surface about the same distance back of the margin of the incision as the other end of the suture.

By tying the suture tightly, the vessel that has been causing the bleeding is usually included. The knot is left outside the wound so that it is not disturbed in continuing the operation.

One surface and all of the incisal edge of the unerupted tooth possible are now exposed by means of sharp narrow chisels employed with mallet blows or hand pressure. The enamel sac of the tooth is removed, at least over the area exposed.

THE DRESSING

A thick paste is made up using zinc oxide, three parts, and powdered rosin, one part, with eugenol as the liquid. This paste is pressed firmly into the opening and smoothed off slightly below the margins of the wound. It is left in place for from three to five days. The dressing protects the wound, reducing inflammation and pain, and prevents the tissue from closing the opening just made.

USE OF TRACTION

If the tooth does not begin to move down after four to six weeks, a flat coil with a hook in its center is cemented to the exposed surface of the crown by the orthodontist and traction applied.

RESULTS

In this series of cases, fifty-five upper cuspids were exposed in forty-two patients, who were all undergoing orthodontic treatment and who ranged in age from 12 to 17 years. Forty-seven of these teeth erupted to the point where bands could be fitted. Many came down without help, but some required the cementation of a hook to the exposed surface of the crown and the application of traction.

In eight cases, the gum tissue healed over the openings and the teeth did not move. Two of these were cases in which the permanent cuspid was situated above and close to the apex of the lateral incisor about midway from labial to lingual aspect. These patients have not again been operated on as yet. In the six remaining cases, all were again operated on, and hooks were attached by means of copper cement and traction was applied. Four of the teeth were brought into place and two have failed to move any appreciable distance. In the last two cases, the patient is still under orthodontic treatment.

As this series was started with no idea of reporting the cases, no exact data on the length of time taken to bring these teeth into place are available. As far as could be ascertained, they had all extruded within a year and a half.

SUMMARY

Most unerupted upper cuspids in children of orthodontic age may be encouraged to erupt by having the heavy gum tissue and overlying bone removed from the incisal edge and one complete surface of the crown. Those teeth that do not start to move of their own accord may usually be brought down by cementing a hook to the surface of the crown with black copper cement and applying traction.

In several of our cases, the enamel sac surrounding the crown of the cuspid appeared cystic. This condition did not interfere with the movement of the tooth and the cyst cavity disappeared as the

tooth erupted. This is in accordance with the findings of Russell[2] in large dentigerous cysts treated by the conservative method.

Failures may be due to (1) failure to provide a large permanent opening through which the crown of the tooth can erupt, or (2) in deeply placed cuspids whose incisal edges are in close contact with the apex of the lateral or central incisor, the inability to obtain sufficient access to free the incisal edge without endangering the pulp of the adjacent tooth.

2. Russell, A. Y.: Conservative Management of Bone Cysts in Children and Adults. J.A.D.A., 23:1719, September 1936.

CONCLUSION

The technic presented here is not new, having been used by most orthodontists for a number of years. That many general practitioners are not familiar with it is shown by the frequency with which young people are referred to the exodontist for the removal of these teeth.

REPORT OF SENATE COMMITTEE ON WARTIME HEALTH AND EDUCATION

A plan to initiate a national health program by increased federal grants to the states, rather than by the establishment of a national system of compulsory health insurance, has been projected by the Subcommittee on Wartime Health and Education, popularly known as the "Pepper Committee." The plan is outlined in an interim report made by the subcommittee to the Committee on Education and Labor of the U.S. Senate, January 2. Members of the subcommittee who signed the report were: Claude Pepper, Florida, Elbert D. Thomas, Utah, and Robert M. LaFollette, Jr. Other members of the subcommittee were: James M. Tunnell, Delaware, and Kenneth S. Wherry, Nebraska.

The plan is significant in that it does not use the approach of the Wagner-Murray-Dingell bill, which proposed a compulsory health insurance system as a part of a national social insurance scheme. The subcommittee's plan attacks such problems as the shortage of health personnel, professional education and the provision of health facilities through increased grants, which the federal government would make available to the states for those purposes. The philosophy of the report is in keeping, in most of its sections, with that officially advocated in the past by both the dental and the medical profession.

The major portion of the subcommittee's report follows:

WARTIME HEALTH AND EDUCATION INTERIM REPORT

[Pursuant to S. Res. 74]

REPORT TO THE SENATE COMMITTEE ON EDUCATION AND LABOR FROM THE SUBCOMMITTEE ON WARTIME HEALTH AND EDUCATION

We have the honor to submit herewith the third interim report of the Subcommittee on Wartime Health and Education.

THE FOUR AND ONE-HALF MILLION IV-F'S

The Nation has been deeply impressed by the fact that approximately four and one-half million young men in the prime of life have been found unfit for military service because of physical and mental defects. In addition, more than a million men have been discharged from service because of de-

fects other than those sustained in battle. One and one-half million men now in uniform were rendered fit for service only through medical and dental care given after they were inducted.

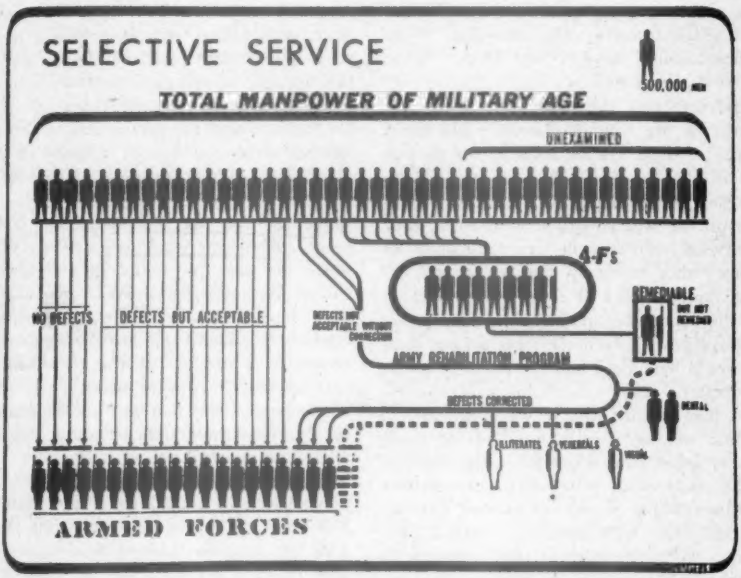
In all, it is estimated that at least 40 per cent of the 22,000,000 men of military age—between eight and nine million men—are unfit for general military duty. This is more than twice the number of men we now have overseas engaged in the great offensives that will bring total victory.

The four and one-half million men in class IV-F are those who remained unfit for military service after all doubtful cases had been examined in terms of the latest revision of Army and Navy physical and mental standards, after induction of those acceptable for rehabilitation in the Army and Navy, and after reclassification of all who by self-rehabilitation or other circumstances become eligible for military duty. It should be emphasized that these four and one-half million men are all rejectable under the lowest possible physical and mental standards, as defined by a special commission of physicians appointed by the President.

Interpretation of the Selective Service rejection data as an index of national health was challenged at the subcommittee's hearings by representatives of the American Medical Association. They pointed out that the standards of physical fitness demanded for military service are considerably higher than those required for normal civilian activity.

While it is true that many people are afflicted with defects that do not prevent participation in ordinary activities, such defects often reduce initiative and working capacity, and, if neglected, may eventually result in serious illness or disability. Minor defects of this kind may not appreciably affect mortality and morbidity rates, or life expectancy tables. They may offer little of interest to physicians engrossed with more spectacular ills. But the patient with a toothache, or with impaired hearing, is well aware of the distress and limitations imposed upon him by his infirmity. In the aggregate, minor defects constitute a serious drain on our manpower.

Regardless of how the Selective Service data are interpreted, the widespread existence of illness and defects among our population has



been demonstrated by numerous extensive surveys conducted under both governmental and private auspices. The findings of some of these surveys, which also have shown that many of these diseases and defects are preventable or remediable with proper medical care, will be cited later in this report.

MEANING OF THE FIGURES

It would be wrong to conclude from the Selective Service rejection figures that we are a nation of weaklings. Our enemies labored under that delusion, and they are learning their error the hard way. On the other hand, it is evident that we have no reason to be smug or complacent about the state of our people's health. We must ask, "What do these figures mean?" and then, "What must we do about it?"

It is clear that the figures do not reflect discredit on the men themselves. The great majority of them are the victims, not the villains, of the situation. Nor do the figures mean that the rejectees are unfit for participation in the war effort; in most cases, they are serving honorably in war production or in some other necessary civilian activity.

The large number of rejections does mean that the manpower problems of the Army and Navy have been much more serious than they would have been had the Nation's health been better. The unavailability of the rejected men means that it was necessary to call into military service hundreds of thousands of other men better fitted for essential civilian tasks and more deeply committed to responsibilities in the society we fight to preserve—men with families, trained mechanics, skilled technicians, and teachers in scientific and technical schools.

If this situation was preventable—and we are profoundly convinced that it was—this nation has an immediate duty to seek an immediate remedy.

REHABILITATION OF REJECTEES

According to officials of the Selective Service System, at least one-sixth of the defects for which men were rejected could be remedied with relative ease, as far as medical science is concerned.

Early in the war, test rehabilitation programs were undertaken by the Selective Service System, but they yielded meager results and were abandoned. In sharp contrast to the results of the Selective Service efforts are those of the Army rehabilitation program. Here remarkable success has been achieved. Approximately one and one-half million men with major defects have been inducted and rendered fit for duty, including 1,000,000 men with major dental defects, more than 250,000 with impaired vision, 100,000 with syphilis and more than 7,000 with serious hernia. The success of this program demonstrates what can be done by vigorous and coordinated effort.

The magnitude of the Army's total dental program is apparent from the following figures: During 1942 and 1943, more than fourteen and one-half million cases[1] were treated, 31,000,000 fillings were provided, 6,000,000 teeth were replaced and nearly one and one-half million bridges and dentures were supplied. This work required 53,000,000 sittings by patients, and the production of three and one-half times the normal quantity of dental supplies and equipment produced in the United States in any one year.

We are told that registrants will continue to be called into service even after VE-day. Since the only physically fit men available will be the newly registered 18-year-olds, men with dependents and those in essential occupations, wisdom and fairness demand that as many as possible of the registrants now in IV-F classification be made fit for service. The subcommittee therefore recommends that the Army continue and, if feasible, expand its rehabilitation program.

Another opportunity for better rehabilitation service is presented by the Barden-La Follette Act (Public Law 113, 78th Cong.). This act recently made federal funds available to state rehabilitation agencies for the medical correction of defects hindering employment. Some IV-F's have already been referred by selective-service boards to state vocational rehabilitation agencies and have had their defects corrected. The immediate possibilities of this mechanism are somewhat limited because initiative is in the hands of the individual states, many of which have not yet developed the medical phase of their rehabilitation programs. Nevertheless, if the

1. The word "cases" as used here does not refer to individuals; an individual may have been recorded more than once as a "case" for separate treatments at the same or different Army posts.

opportunities offered by the Barden-La Follette Act program were more widely known and utilized, more substantial progress could be made in the rehabilitation of rejected men.

HEALTH OF THE REST OF THE POPULATION

According to the National Health Survey, conducted by the United States Public Health Service in 1935, more than 23,000,000 people in the country had a chronic disease or a physical impairment. In the working-age group (15-64), more than 3,000,000 people had impairments such as deafness, blindness or orthopedic handicaps, and more than a million were estimated to have hernia.

A Farm Security Administration study of 11,495 individuals in 2,480 farm families residing in twenty-one typical rural counties in seventeen states in 1940 showed that 96 per cent of those examined had significant physical defects. The average number of defects per person was three and one-half. Only one person out of each 100 examined was found to be "in prime physical condition."

Among nearly 150,000 young people examined by physicians for the National Youth Administration in 1941, 85 per cent needed dental care, 20 per cent needed eye refractions, 19 per cent needed tonsillectomies and 12 per cent needed special diets. Approximately one youth in every seven was in urgent need of some kind of medical or dental treatment. About one-third of the young people had health defects which limited their employability. Only ten out of each 100 examined had no defects for which the examiner made a recommendation.

High defect rates are not limited to low-income groups such as those studied by the Farm Security Administration and the National Youth Administration. The Life Extension Institute, in examinations of 300,000 insurance policyholders selected indiscriminately with regard to sex, age and occupation found that 59 per cent were so physically impaired as to need the services of a physician at the time of examination.

Industrial casualties take a heavy toll. From Pearl Harbor to January 1, 1944, 37,600 American workers were killed on the job—7,500 more than the military dead for the same period. More than 200,000 workers were permanently disabled and four and one-half million were temporarily disabled.

EFFECT OF ILLNESS ON WAR PRODUCTION

The profound influence of illness and disability on war production is illustrated by figures on work absences due to sickness and accidents. In 1943, the average male industrial worker lost 11.4 days and the average female industrial worker 13.3 days of work owing to sickness and injury. By far the greater proportion of this loss—80 per cent in the case of men and 90 per cent in the case of women—was believed to be due to common ailments. Application of these figures to the number of employed male and female workers in the United States today indicates a loss of more than 600,000,000 man-days annually. This is about forty-seven times the amount of time lost through strikes and lockouts of all kinds during 1943.

Intensive investigation and the testimony of many expert witnesses has convinced the subcommittee that a great deal of illness and disability could be avoided if the benefits of modern medical and public health science were made readily available in all sections of the country and to all persons regardless of economic status. In recent years, and especially since the outbreak of the war, there has been a great awakening of public interest in all matters pertaining to health. More than 10,000,000 men and women in the armed forces are now receiving the benefits of complete medical and hospital care. The advantages of such care will not be forgotten after the war. Considerable increase in the demand for medical care may therefore be expected in the postwar period, and we should plan immediately to meet this increased demand.

On the basis of the information it has gathered to date, the subcommittee is not prepared to formulate a complete national health program or to make detailed recommendations concerning all the health problems that remain unsolved. In this interim report, however, we shall make preliminary observations regarding certain basic subjects which require further study. We shall also make specific recommendations regarding provision of facilities and services which we believe to be prerequisites to better national health and physical fitness.

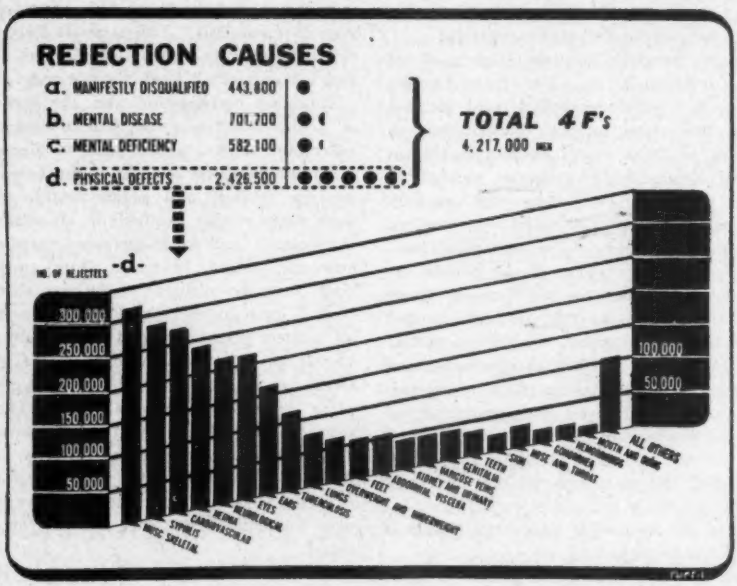
NEED FOR IMPROVED PREVENTIVE SERVICES AND FACILITIES

During the period 1900-1940, the death

rate in the United States fell from 17.2 per 1,000 population to 10.8 per 1,000, a reduction of nearly 60 per cent. Improvement has been most notable with respect to diseases which respond favorably to better sanitation and immunization procedures. The death rate from typhoid and paratyphoid fevers, for example, was reduced by 97 per cent, from diarrhea and enteritis by 92 per cent and from diphtheria by 97 per cent.

A major share of the credit for this remarkable progress belongs to the public health agencies of federal, state and local governments. The development of the preventive services furnished by these agencies, however, has been very uneven in different sections of the country. As recently as 1935, only 615 of the 3,070 counties in the United States had full-time local public-health agencies. By 1942, under the stimulus of federal grants made available by the Social Security Act, the number of counties served by such agencies had approximately tripled. Today, however, about 40 per cent of the counties of the United States still lack full-time local public-health service. Many of the existing health departments are inadequately financed and staffed. Minimum preventive services under the administration of full-time local public health departments staffed with qualified personnel should be provided in every community. To accomplish this, additional federal financial aid would probably be necessary. If new and consolidated areas of local health administration were established, however, as suggested by the American Public Health Association, the total funds needed probably would not exceed greatly the present total of health department expenditures.

Complete geographic coverage by full-time local health departments would not be sufficient in itself, however, to enable us to take full advantage of the possibilities for further advances in the control of venereal infections, tuberculosis, malaria and other preventable diseases. Funds are needed for expansion of health-department activities in these fields and many others, such as food and milk sanitation, industrial hygiene, maternal and child health and health education.

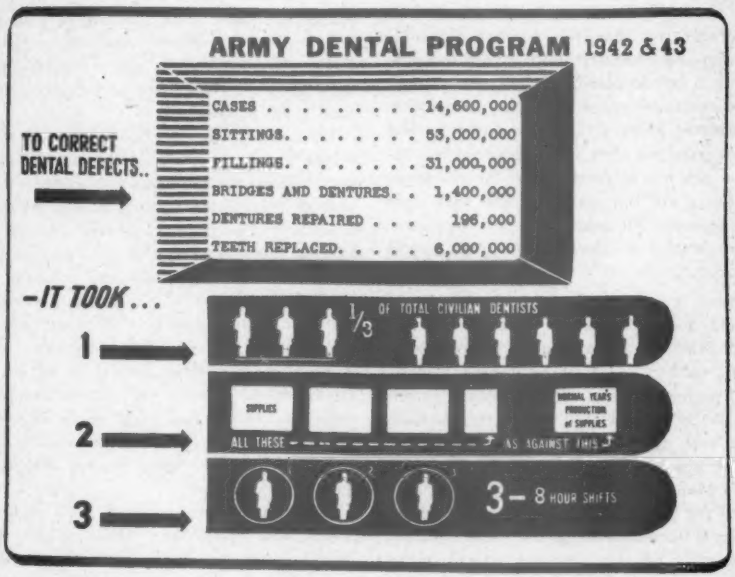


The next section of the report, which is not published here, deals with water supplies, sewerage and rural sanitation.

IMPORTANCE OF CHILD HEALTH

Most of the witnesses who testified before the subcommittee emphasized the necessity of correcting physical defects early in the life of the child. The importance of this is illustrated clearly by a study conducted by the United States Public Health Service in Hagerstown, Md. The health of the school children in Hagerstown has been observed over a period of years, and careful records of the findings have been kept. Recently, the Selective Service medical records of the Hagerstown registrants were compared with the school health records obtained by examination of the same individuals during their childhood. The comparison showed that many of the defects for which registrants were rejected had been discovered as much as fifteen years earlier, while the registrants were students in high school and grade school, and that in the years intervening between the school health examination and the Selective Service examination many of the defects remained uncorrected and unimproved.

The Hagerstown story is a familiar one to many physicians who freely give their time and energy in annual examination of school children. Every physician who conducts such examinations knows the discouraging experience of seeing his recommendations for the correction of physical defects go unheeded. In many children the same defects are noted year after year, and nothing is done about them. Obviously, more effective methods of following up the doctors' recommendations are needed. The opportunities for supervision and promotion of children's health in the school are so great that no effort should be spared to develop methods by which present neglect can be overcome. The Nation's


ARMY DENTAL PROGRAM 1942 & 43
TO CORRECT DENTAL DEFECTS..
CASES 14,600,000
SITTINGS. 53,000,000
FILLINGS. 31,000,000
BRIDGES AND DENTURES. . 1,400,000
DENTURES REPAIRED . . . 196,000
TEETH REPLACED. 6,000,000
-IT TOOK...
1
1/3 OF TOTAL CIVILIAN DENTISTS
2
SUPPLIES
ALL THESE
AS AGAINST THIS
3
3 — 8 HOUR SHIFTS

and the Government's rightful concern in this matter is demonstrated by the unfitness of millions of young men in a time of national crisis, and the subcommittee plans to investigate the subject further. . . .

The next section of the report deals with mental hygiene and is not published here.

MEDICAL EDUCATION

Certainly, from the point of view of future needs, there should be no reduction in the present output of trained medical personnel.

According to the American Medical Association, curtailment of this output is threatened by current Selective Service policies. Because of the urgent need of the armed forces for young men, the Selective Service System has deemed it impractical to continue occupational deferment of premedical and predental students. For the same reason, the Army Specialized Training Program for premedical and predental students has been drastically curtailed. The American Medical Association estimates that enrollment of medical students may fall as much as 50 per cent beginning in 1945. If this proves to be the case, there would be only 2,500 medical graduates in 1948, about half the usual number and considerably less than the number of physicians who die annually. All expert opinion, however, is not so pessimistic. The chairman of the executive council of the Association of American Medical Colleges has informed the subcommittee that medical-school administrators are not alarmed about the situation, that classes are full for 1944 and that little apprehension is felt concerning the 1945 class. Further study of the facts is apparently necessary.

If there is actually a threatened shortage, it would seem that there must be in the United States the few thousand persons of the age, caliber and training needed to raise annual premedical and medical school enrollments to the number required for the duration of the war emergency. It is true that an effort would have to be made to find students. Many war veterans and young men rejected for military service because of physical defects do not know of the great need for doctors or of the opportunities present in the study of medicine. Moreover, certain barriers and prejudices which limit enrollments could be removed. The financial barriers which face many prospective students could be overcome by more adequate scholarships or by loan funds. Some qualified students cannot gain admission to medical schools because of tacit racial or religious discrimination. Lastly, there is a great untapped source of future doctors among the women of the Nation. We are unable to discover any compelling reason for the failure of this country to utilize its womanpower to prevent what is claimed to be a serious future shortage of physicians. Other nations have done so; we have simply never tried.

Two sections on training for demobilized physicians and on the distribution of medical facilities have been omitted here.

DISTRIBUTION OF PHYSICIANS

Shortages of doctors, dentists, nurses and other medical personnel are marked in many communities, and, in general, medical personnel are inequably distributed throughout the country. For example, in 1944 Massachusetts had about three times as many active physicians in proportion to population as did South Carolina. Similar disproportions exist between other states and between local areas within the same state. Counties with more than 5,000 population may be without a single physician, while other counties in the same state may have one active physician for each 1,000 people.

Extensive studies conducted by the United States Public Health Service show that the distribution of physicians is influenced by several interrelated factors, among which are community purchasing power, adequacy of hospital facilities, degree of urbanization, proximity to medical schools and teaching hospitals and presence of professional colleagues. Of these factors, the first three are probably the most significant, and community wealth is probably the most important of all. In 1938, counties with per capita income of more than $600 had eight times as great a proportion of physicians to population as did counties with per capita income of less than $100.

Rural areas are generally less well supplied with physicians than urban areas. Strictly rural counties in 1938 had only about one-third as many physicians in proportion to population as did urban counties. Recent data supplied by the Procurement and Assignment Service show that the eighty-one counties reported to have no active physician, as well as the 141 counties reported to have more than 5,000 inhabitants per active physician, were practically all rural. The wealthier rural areas are better supplied than are the poorer rural areas, but even the wealthiest goup of rural counties in 1938 had 30 per cent fewer physicians in proportion to population than urban areas with the same per capita income.

The shortage of physicians in rural communities is not due to less need for medical

care than in cities. Studies made by the Farm Security Administration suggest that the burden of illness in rural areas is the same as, or greater than, in urban centers.

SITUATION GROWS STEADILY WORSE IN RURAL AREAS

Despite this need, medical graduates have shown increasing reluctance in recent decades to settle in rural communities. In North Carolina, for example, the number of doctors in strictly rural areas fell from 1,125 in 1914 to 719 in 1940. In that year, 73 per cent of the population of the state lived in rural areas, although such areas contained only 31 per cent of the state's physicians. The burden of caring for rural patients falls increasingly on the older practitioners who, despite sometimes heroic efforts, are frequently unable to do the work demanded of them.

There is no doubt that lack of hospitals and diagnostic facilities is one of the most important factors in keeping doctors away from rural practice. In fact, the presence of hospital facilities alone, independently of such factors as community wealth and size of population, appears to attract physicians. This is suggested by a United States Public Health Service study which shows that among counties with per capita income of less than $300, those with no general hospital beds had 60 per cent fewer doctors in proportion to population than did those with 250 or more general hospital beds.

Many crowded war-industry and extra-cantonment communities are also suffering from a severe shortage of doctors. In some places shortages have been relieved by relocation of physicians through the Procurement and Assignment Service of the War Manpower Commission, but in others the situation remains critical and without hope of relief except through assignment of Public Health Service physicians, a proposal which Congress has rejected. Data submitted by the Procurement and Assignment Service show that at the end of 1943, 553 counties had more than 3,000, 141 counties had more than 5,000, and twenty counties had more than 10,000 people per active physician in private practice. In addition, eighty-one counties, thirty of which had populations of more than 3,000, had no practicing physician.

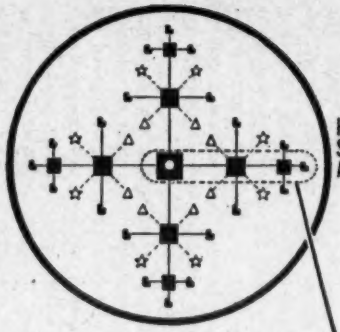
The wartime shortages are merely sharper manifestations of the long-standing and steadily growing maldistribution described above. There is every indication that maldistribution will become even more marked after the war unless effective steps are taken to reverse the trend. As the older physicians who remain in rural communities die or retire, the situation becomes increasingly critical. Polls of the opinions of young Army and Navy doctors show that the vast majority want specialist training and practice, preferably with a group. Only 12.5 per cent indicated a desire for rural practice. We may therefore expect the young doctors and dentists to continue to shun the countryside unless they are offered good professional surroundings, including modern hospital facilities and an opportunity to earn a good living. Without such positive incentives the opportunity for better distribution presented by release of medical personnel from the armed services will be lost. More uniform licensure laws are also needed.

THE MEDICAL CENTER IDEA

Hospitals were formerly considered only as places in which to care for the seriously ill, and even today many hospitals are nothing more than that. Modern programs of hospital construction should have as their aim the ample provision of a more inclusive type of hospital service. The subcommittee has studied with interest the growing trend toward utilization of a relatively new type of facility called a medical center, which combines and coordinates the three major aspects of modern medical care—the preventive, the diagnostic and the therapeutic services. The medical center brings together doctors' offices, diagnostic and laboratory equipment, hospital beds and preventive work. It furthers group practice by physicians, surgeons and dentists; encourages experimentation and research, and stimulates dissemination and exchange of medical knowledge.

This principle of combining the preventive, diagnostic and curative services of medicine into a single functional unit, here called the medical center, has been advantageously applied on a large scale in certain great university centers. It is also applicable, however, to the smaller-scale needs of rural communities throughout the Nation. The establishment of a network of "outpost clinics," to use the phrase of a representative of the American Medical Association, the creation of "diag-

COORDINATED HOSPITAL SERVICE PLAN



■ HOSPITAL
◣ HEALTH CENTER
☆ INSTITUTION (CHRONIC DISEASE)
△ NURSING HOME (CHRONIC DISEASE)

Teaching Research Consultation

CANCER CLINIC
PSYCHIATRIC SERVICE
HEART CLINIC
MAJOR SURGERY
INTERNAL MEDICINE
OBSTETRICS
PEDIATRICS
ORTHOPEDIC SURGERY
COMMUNICABLE DISEASES
TUBERCULOSIS
VENEREAL DISEASE
OTHER
TEACHING
NURSES
INTERNS
RESIDENTS
POST GRADUATES
LABORATORY
X-RAY
PATHOLOGY
BACTERIOLOGY
CHEMICAL
PHYSIOTHERAPY
DENTISTRY
EYE, EAR, NOSE, THROAT
DIETETICS

BASE

DISTRICT

MAJOR SURGERY
OBSTETRICS
INTERNAL MEDICINE
COMMUNICABLE DISEASES
TUBERCULOSIS
VENEREAL DISEASE
OTHER
PEDIATRICS
EYE, EAR, NOSE, THROAT
DENTISTRY
PHYSIOTHERAPY
LABORATORY
X-RAY
PATHOLOGY
BACTERIOLOGY
CHEMICAL
TEACHING
NURSES
INTERNS
DIETETICS

RURAL

INTERNAL MEDICINE
OBSTETRICS
EYE, EAR, NOSE, THROAT
DENTISTRY
MINOR SURGERY
LABORATORY
X-RAY
BACTERIOLOGY

HEALTH CENTER

OBSTETRICS
EMERGENCY MEDICAL AND SURGERY
LABORATORY
X-RAY
BACTERIOLOGY
DENTISTRY
PRIVATE OFFICE OR OFFICES FOR PRIVATE PHYSICIANS
ADMINISTRATIVE PUBLIC HEALTH OFFICES
HEALTH OFFICER
SANITARIAN
PUBLIC HEALTH NURSES
PUBLIC HEALTH CLINICS
MATERNAL AND CHILD HEALTH
TUBERCULOSIS
VENEREAL DISEASE
PUBLIC HEALTH EDUCATION

PLAN PROVIDES FOR CONSTANT EXCHANGE BETWEEN HOSPITALS OF INFORMATION, TRAINING, AND CONSULTATION SERVICE, AND PERSONNEL, AND FOR REFERRAL OF PATIENTS WHEN INDICATED

nostic centers," as urged by the Surgeon General of the Navy, and the "expansion of the present functions of the hospital," advocated by the spokesman of the American Hospital Association, appear to be expressions of the same basic aim—the provision of facilities suited to the practice of modern, scientific medicine.

PLANNED NETWORK OF FACILITIES URGED

Terminology in this field is far from uniform. The Surgeon General of the United States Public Health Service urged development of a coordinated network of four basic types of medical center facilities—the small neighborhood or community "health center," the "rural hospital," the "district hospital," and the large "base hospital." (See chart, page 278.)

The physical structures required for many of these four basic types of units already exist in many areas. Here the primary need is for regional planning and organization of the existing facilities so that they might function in a coordinated manner, rather than for the construction of new buildings. In some places, minor alterations, renovations or addition of new wings might suffice to convert existing public or voluntary institutions into units of the coordinated regional plan.

The smallest unit, the health center, might include offices for local physicians and dentists; facilities for emergency medical and surgical work; a small number of beds for obstetrical care; laboratory facilities for x-ray, blood, and bacteriological procedures, and health department offices and clinics where these are not otherwise provided.

The rural hospital, located within easy reach of several health centers, would be larger than the health center and would provide additional basic medical, surgical, obstetrical and laboratory services. The size of the rural hospital would depend on the needs of the area it served, but it should be a modern hospital in every sense of the word.

Many of the health centers and rural hospitals probably would serve areas which could not support specialists' services of their own. Therefore, such services would be provided through district hospitals, located so that they could conveniently serve several rural hospitals. Local needs and preferences might determine whether patients from the rural areas were transported to the district hospitals or whether the specialists from these hospitals visited the smaller units periodically. In most instances the district hospitals would provide nurse training and instruction for interns, including discussion of complex cases and of medical advances.

BASE HOSPITALS

Finally, as the hub of each major medical service area, there would be a large base hospital. In most cases the major service area would be a state, though some states might have more than one major service area, and in some instances a base hospital might serve two states or sections of two states. The base hospital would be a teaching hospital, staffed with experts in every medical and surgical specialty, equipped for complete diagnostic services, and designed to conduct extensive postgraduate work and research. Besides its general hospital beds, it would have, either on its premises or nearby, facilities for institutional care and study of tuberculosis, nervous and mental disease, contagious disease and orthopedic and chronic disease. The benefits of the research carried on in the base hospital would be passed on to the smaller units in the network, and there would be constant back-and-forth referral of patients and diagnostic information, as well as interchange of personnel, between the large center and the smaller institutions.

With such graded networks—the health center, the rural hospital, the district hospital and the base hospital—covering the entire country, facilites would be available through which every person, regardless of where he lived, might receive *(a)* immediate diagnosis and care for the common, relatively simple ailments and *(b)* easy access when necessary to the more complicated types of medical service.

The development of such a network of medical centers would constitute a great step toward the goal of providing a high quality of medical service everywhere in the nation. It would enable communities to cope much more adequately with the medical needs of war veterans and their families. It would also create opportunities for group and individual practice for the 40,000 medical and dental officers who will return from the armed forces, as well as for returning nurses and other health personnel.

HEALTH DEPARTMENT CENTERS

Local health departments should be moved from the musty basements of county courthouses and city halls to modern, well-equipped buildings where the health officer and his staff could efficiently carry on their very important activities.

The American Public Health Association has proposed the creation of approximately 1,200 public health districts of roughly 50,000 population each, with at least one district health center and one subcenter in each district. These health department centers could in many instances be included in the medical center type of facility described above.

With improved facilities the health departments could undertake expanded public health programs designed to eradicate venereal disease, tuberculosis, malaria and hookworm; to lower maternal and infant mortality, and to promote health through education. Cooperation would be fostered between the health department and local private practitioners, and both would benefit by a more comprehensive approach to the health problems of the people.

ACHIEVING A HEALTH FACILITIES PROGRAM

According to careful estimates made by the United States Public Health Service, facilities are needed for 100,000 new general hospital beds, 94,000 new nervous and mental hospital beds, and 44,000 tuberculosis beds. In addition, 66,000 general beds, 97,000 nervous and mental disease beds and 16,000 tuberculosis beds are situated in hospitals that are obsolete and that should be replaced. Approximately 2,400 modern structures are needed to serve as headquarters for local health departments.

A program for construction of these facilities would have to be well-planned and well-coordinated, in order to avoid the mistakes which characterized the construction boom following World War I. Areas which need hospitals most should be given priorities for building materials and surplus medical supplies. The hospitals should not only be planned and built along modern, functional lines, but should be staffed and maintained so as to assure a high level of operating efficiency. Voluntary and public hospitals should work together in a coordinated manner. Both, in turn, should cooperate with the health department and private practitioners.

The cost of an adequate health-facilities program cannot be borne by the states and localities alone. Federal grants-in-aid to the states on a basis of need will be necessary.

In order to permit local initiative and control, state programs should be drawn up by state health planning commissions in cooperation with local authorities. Such commissions, consisting of representatives of professional groups and the public, could be appointed by governors in states where they do not now exist. In drawing up state plans the commissions should consider the needs of all sections of the state, should include in the plan all suitable existing public and voluntary hospitals and should plot the new construction as well as the expansion or replacement of existing facilities needed for adequate service. Before federal funds could be granted, however, over-all state plans and individual projects should be reviewed and approved by the United States Public Health Service to make sure that they meet certain minimum standards of construction, operation and complete, coordinated service. There should be reasonable assurance that a new facility will have enough patients to justify its existence. In communities where sufficient income from fees of individual patients does not otherwise appear probable, provision for group prepayment plans of tax-supported services, or both, should be required.

Grants to both public and voluntary institutions included in the plan would be administered through a state agency, in most cases the state health department. To insure continued representation of the public, health advisory councils should be appointed to confer with the state agency administering the plan.

PAYMENT FOR MEDICAL CARE

Much has been said and written about the financial barriers to good medical care. There is general agreement that good medical care is necessarily expensive; that the burden of illness is unpredictable and falls unevenly, striking one family much harder than another; that sickness comes unexpectedly and may wipe out the laboriously acquired savings of an entire family, and that for these reasons a considerable part of the population does not receive either the amount or the quality

of medical care it needs and should have.

In 1942 there were approximately 33,400,000 family units in the United States. The accompanying table shows their income distribution and the amounts they spent for medical care; also shown are the income distribution and the amounts spent for medical care by the 41,200,000 "spending units," including individual consumers as well as family units.

The table indicates that even in the relatively prosperous year of 1942, 70 per cent of the families in the United States had income of $3,000 or less. The average family expenditure for medical care was estimated at $100, but families with incomes under $3,000 spent considerably less than this. Nevertheless, the low-income families spent a larger proportion of their income for medical care than the higher-income families.

INCOME AND MEDICAL CARE EXPENDITURES OF THIRTY-THREE AND ONE-HALF MILLION FAMILIES AND OF FORTY-ONE MILLION SPENDING UNITS,* 1942

Aggregate Money Income During 1942	Approximate Number of Families in Each Income Group	Approximate Number of Spending Units† in Each Income Group	Percentage of Total Families	Percentage of Total Units	Average Amount Spent for Medical Care‡		Proportion of Total Income Spent for Medical Care	
					Families	Spending Units	Families	Spending Units
							Per Cent	Per Cent
Less than $1,000	6,900,000	10,100,000	21	24	$42	$35	6.8	5.7
$1,000 - $2,000	9,800,000	12,600,000	29	31	68	62	4.5	4.2
$2,000 - $3,000	6,800,000	7,900,000	20	19	96	94	3.9	3.9
$3,000 - $5,000	6,700,000	7,300,000	20	18	143	141	3.7	3.7
More than $5,000	3,200,000	3,300,000	10	8	241	241	2.4	2.4
Total	33,400,000	41,200,000	100	100	100	90	3.6	5.0

*Based on data from "Civilian Spending and Saving 1941 and 1942," Division of Research, Consumer Income and Demand Branch, Office of Price Administration (March 1, 1943).
†The term "spending unit" includes individual consumers as well as families.
‡Includes dental and nursing service.

CARE RECEIVED VARIES WITH INCOME

Other studies, particularly those of the Committee on the Costs of Medical Care, show that low-income families not only spend less for medical care, but also receive much less care than those with higher incomes. The highest income group in 1929 received more than twice as much physician's care and more than three times as much dental care as did the lowest income group. Yet it is the low-income group that needs the most medical care. Sickness and poverty go together. In 1935 wage earners in families with incomes under $1,000 per year suffered about twice as many days of disabling illness as did workers in families with incomes over $3,000, according to the National Health Survey. Facts do not support the observation that "the poor and the rich receive the best of medical care; only the middle class suffers." High-quality care on a charity or low-cost basis is available to the poor in relatively few places. Even in those places, low-income families are often reluctant to accept charity.

In 1933 the Committee on the Costs of Medical Care estimated that adequate medical and dental care, with proper remuneration for those furnishing the service, could be provided at an average annual cost of about $125 per family. Since this estimate was made, prices of medical goods and services have risen so that the figure would probably be about $150 if it were brought up to

date. Other authorities, however, place the average cost of providing adequate services at a much higher figure. It is evident from studies of family budgets that the 50 per cent of our families with incomes under $2,000 cannot afford to pay even $150 a year for medical care and that this amount imposes hardship upon many families in the $2,000 to $3,000 income group. The result is that doctors' bills pile up and many people will not call a doctor until they are seriously ill.

FEE-FOR-SERVICE VERSUS INSURANCE

Evidence such as this leads the subcommittee to conclude that the "pay-as-you-go" or fee-for-service system, which is now the predominant method of payment for medical services, is not well suited to the needs of most people or to the widest possible distribution of high-quality medical care. It tends to keep people away from the doctor until illness has reached a stage where treatment is likely to be prolonged and medical bills large. It deters patients from seeking services which are sometimes essential, such as specialist care, laboratory and x-ray examinations, and hospitalization. Individuals with low incomes, whose need is greatest, are most likely to postpone or forego diagnosis and treatment.

The solution of this problem will not be easy. Undoubtedly it lies in some form of group financing which would make it possible to share the risks and distribute the costs more evenly. This might be achieved by voluntary or compulsory health insurance or by use of general tax funds, or by a combination of these methods. Insurance methods alone would not be enough, because they are not applicable to the unemployed or to those in the lowest income groups.

In order to meet the requirements of the public and of the professional groups concerned, any method which is evolved should offer complete medical care, should be reasonable, but not "cut rate" in cost, should include substantially all of the people, should afford the highest quality of care, should permit free choice of physician or group of physicians, should allow democratic participation in policy making by consumers and producers of the service, should be adaptable to local conditions and needs and should provide for continuous experimentation and improvement. So far as possible, it should also avoid the charity relationship.

VOLUNTARY VERSUS COMPULSORY INSURANCE

The way in which these aims can best be achieved is now the subject of considerable debate. Advocates of voluntary health insurance, such as the Blue Cross hospitalization and the medical society prepayment plans, hold that such plans will fulfill all needs if given sufficient time, and if supplemented by tax-supported grants for medical care to all recipients of public assistance. Others believe that only a small percentage of the population will ever obtain complete medical care through voluntary prepayment plans, and propose compulsory health insurance along some such lines as those set forth in the Wagner-Murray-Dingell bill (S. 1161, 78th Cong.). Still others maintain that needs would be met most satisfactorily and economically through a universal system of tax-supported medicine. At this stage of its investigation, the subcommittee is not prepared to pass judgment on these differing opinions. It is in agreement, however, with those who feel that remediable action is overdue and should not be long delayed.

Pending the achievement of a solution which will assure complete medical, dental and hospital care for the whole population, more adequate provision should be made for medical care of the needy. This will require increased appropriations by local, state and federal governments. Under the Social Security Act, federal funds are granted to state programs for aid to the needy aged, the needy blind and needy dependent children. Federal funds can be used for medical care of individuals in these categories if the state law so provides, but in most states medical care is not included among public-assistance benefits. Furthermore, federal funds are not available to state programs for aid to needy individuals other than the aged, the blind and dependent children. Legislation introduced in the 78th Congress provided for amendment of the Social Security Act so that federal and state funds would be available to help states finance medical care for the needy, regardless of category. Proposals have also been made to alter allotment procedures governing distribution of federal funds to state public-assistance programs so that more money could be given to states where needs are greatest. These measures, if approved, would help relieve the financial load on hospitals and practitioners, who now give a great deal of free

care. Such relief for hospitals and physicians would permit them to lower their charges to prepayment plans and thus encourage the enrollment of more people from the group able to bear the average cost of medical care.

MEDICAL RESEARCH

Magnificent progress has been made in medical research during the war. The curative powers of penicillin and of the sulfa drugs, the life-saving value of blood plasma and serum albumin, the efficacy of D. D. T. powder and typhus vaccine and the development of new malaria-control methods are all fruits of a concentration and expansion of medical research resulting from determination to win the war. Adequate financing, coordination, and teamwork have been the keys to this success. Through governmental agencies such as the Army, Navy and the Office of Scientific Research and Development, and nongovernmental agencies such as the National Research Council, the universities and other groups, the Nation's resources for research have been mobilized in a vast cooperative effort.

With victory in sight, we now approach the challenges of peace. Many problems await solution. Much long-term as well as short-term or "practical" research into the causes and cures of cancer, arterio-sclerosis (hardening of the arteries), hypertension (high blood pressure), dental decay and nervous and mental disorders must be undertaken in order to assure further progress against disease.

The Office of Scientific Research and Development has served well as an emergency agency through which to channel federal aid for medical research. Federal aid must continue if the great possibilities offered by medical research are to be realized. The way in which federal aid is to be given and administered must now be carefully considered.

Government cannot, and must not, take the place of philanthropy and industry in the sponsorship of research. It is essential, however, for the Federal Government to provide resources for coordinated attack on medical problems which affect the country as a whole. In no other way can science be given full freedom and opportunity to serve the Nation in peace as it has in war.

EDUCATION, LEGISLATION AND ORGANIZATION

The subcommittee recognizes the complexity of the task of providing good medical care to all the people. We believe that there are three necessary methods of approach to this task. One approach without the others would be unrealistic and ineffective.

The first involves education of the people, of the profession and of the Government. We must collectively accept the fact of widespread existence of disease, disability and injury, much of which medical knowledge today is able to prevent, alleviate or cure.

The second approach is through legislation. There is urgent need for modern medical facilities in many places throughout the Nation, especially in rural areas and in crowded war-industry communities. To meet these needs money must be provided, and federal financial assistance will be necessary.

The third approach is through better organization of medical services. There is wide agreement that improved organization would result not only in a higher quality of service but also in considerable economy of time, effort and money. The necessary reorganization can best be achieved, and the welfare of the professions and the public advanced, by regional planning such as that provided for in the health and medical center proposal set forth above.

RECOMMENDATIONS

On the basis of the preliminary findings outlined above, the subcommittee

1. Recommends that federal grants-in-aid to states be authorized now to assist in postwar construction of hospitals, medical centers and health centers, in accordance with integrated state plans approved by the United States Public Health Service.

2. Recommends that federal loans and grants be made available to assist in postwar provision of urban sewerage and water facilities, rural sanitation and water facilities and milk pasteurization plans, in communities or areas where such facilities are lacking or inadequate.

3. Urges state and local governments to establish full-time local public health departments in all communities as soon as the needed personnel become available. With this aim in view, consideration should be given to rearrangement and consolidation of local health jurisdictions and to amalgamation of existing full-time and part-time local health departments with overlapping functions. The

Federal Government should increase the amount of its grants to state health departments to the end that complete geographic coverage by full-time local health departments may be achieved and that state and local public health programs may be expanded in accordance with needs.

4. Recommends that the Army consider the feasibility and advisability of expanding its program for induction and rehabilitation of men rejected because of physical and mental defects.

5. Recommends that the medical records of the Selective Service System be preserved and that funds be appropriated for further processing and study of these records.

6. Reports the acute shortage of personnel with training in psychology and psychiatry and the need for immediate steps to increase the output of such personnel with a view to providing child-guidance and mental hygiene clinics on a far wider scale.

7. Recommends that federal scholarships or loans be made available to assist qualified students desiring medical or dental education; and urges that increased enrollment of women in medical and dental schools, and premedical and predental courses, be encouraged in every way possible.

8. Recommends that federal funds be made available to states for medical care of all recipients of public assistance and that allotment formulas governing distribution of federal funds to state public assistance programs be made more flexible in order to give more aid to states where needs are greatest.

The recommendations made above should be put into effect as soon as possible. We should begin planning now for the reconversion period. Further delay will postpone orderly solution of our health problems and deprive us of an effective means of aiding industry to maintain full production and employment after the war.

A comprehensive health-facilities and medical-facilities program, planned now and undertaken as soon as materials and labor become available, would soon pay big dividends in improved national health and physical fitness. We have seen what neglect of opportunities for better health has cost us during this war. We should resolve now that never again, either in war or in peace, will the Nation be similarly handicapped.

DENTISTRY IN A NATIONAL HEALTH PROGRAM

THOMAS PARRAN,† M.D., Bethesda, Md.

FEW subjects are more interesting than the drama of medical discovery and progress. A century ago, a young American dentist, Horace Wells, wrote one of the most glorious chapters in that story. His discovery and demonstration of a way to eliminate pain in surgery has established him as one of the world's great pioneers.

The pioneer spirit which motivated Wells is the peculiar genius of America. Our forefathers were alive to their opportunities. With strong will and effort, they seized upon those opportunities and achieved the impossible—on frontiers of knowledge as well as on geographic frontiers.

As an example, compare the health of the nation today with that of a century ago. In 1844, when Wells first used nitrous oxide, the average life expectancy of a new-born baby was about 35 years. Today, it is over 65 years. The best medical skill of that day could cure almost no diseases. Major surgery was virtually a death sentence. Smallpox was the only communicable disease for which we had a preventive. Pasteur and the golden age of bacteriology were yet to come. Modern nutrition and chemotherapy were yet obscured in the mists of destiny.

The recent discovery and use of blood plasma, sulfa drugs, penicillin and a dozen other new technics emphasize the dynamic quality of medical science. Even more, these revolutionary changes are reshaping the concept of public health and medical practice. No longer is it a fight against death: it is also a fight for life, and for a life richer in physical and mental health than we have yet envisioned.

While medical science becomes surer and surer in its technics, the need grows to put it to use for all people. As compared with the science of the future, our present knowledge is meager indeed, but it is vast, incredibly vast, as compared with the knowledge that we now put to use. Indeed, abounding health and longer life for a majority of the people are practical, attainable goals, if we but use fully the knowledge and skill that we already possess.

We cannot attain these goals by proclaiming them. Their attainment must be planned for and the plans organized. Planning must consider all needs; draw upon all resources; weigh limitations; accept risks. The inspiring lesson that the war has taught us is this: our country possesses the physical resources, the brains and the manpower to accomplish a thousand "impossibles" for winning the victory. It is unthinkable that we should reject our proved abilities in the face of an even greater challenge—winning the peace.

A democracy that fosters freedom of thought and individual initiative—freedom that enabled Wells and men like him to explore and proclaim new frontiers—must also accept responsibilities for the well-being of the people. No other human need is more closely allied with national well-being than is health.

The future of national health lies in increasing the amount, kind and quality of service to the people. The key problems are to obtain enough well-trained people and to provide enough well-

*Read at the Horace Wells Centenary Celebration, Hartford, Conn., December 11, 1944.

†Surgeon General, U. S. Public Health Service.

equipped hospitals and health centers to do the job. The cost is well within our ability as a nation.

This audience is well acquainted with the inequitable distribution of medical, dental and hospital service. Dentists, like physicians and hospitals, have been concentrated in areas with sufficient population and wealth to make their practice possible. As a result, personnel and facilities essential to the provision of medical and dental care are not distributed in proportion to need. To correct the disparity between the services available in our great metropolitan centers and those in rural areas, we should plan now to make up the deficits in facilities and professional skill, area by area.

Hospitals in the time of Horace Wells were called "houses of death." Today, with the aid of instrumentalities and skill then unknown, the hospital performs miracles of life-saving. In the future, the hospital should be the center of health and medical services of every type, to which all people turn not only for healing, but also for health.

Dentistry has not been so dependent on the hospital as has medicine; nor have hospitals used dentistry as an integral part of the service that they offer. Too few general hospitals have dental surgeons on their staffs; still fewer have dental clinics. For the most part, dentistry is utilized as an aid to diagnosis. In the hospital of the future, we should expect to see increasing recognition and use of the dentist's contribution to health. I am proud to say that every marine hospital operates a dental clinic. Complete dental care is an integral part of the medical program conducted by the Public Health Service for the U. S. Coast Guard and merchant seamen. An important part of the good medical care given to men and women in the Army and Navy has been the excellent dental service. One of the most impressive contributions to national health has been the enormous volume of reparative work done by Army and Navy dental surgeons for the correction of defects in draftees and recruits.

The hospital of the future, then, is not a single, independent institution, but part of a system of health service, coordinated functionally and administratively to provide complete health care to every community. At the center of a state or regional system is the base hospital, a large institution connected with professional schools. Here would be concentrated specialist services and facilities where research, training, expert diagnosis and treatment for difficult cases would be provided. Serving more directly the people of the area would be a series of district hospitals. These would be somewhat smaller institutions, rendering complete medical service and providing training for interns and nurses. In outlying areas, there would be still smaller rural hospitals. These would provide well-equipped workshops for private practitioners and health agencies and would be the source of more limited types of service; and, in remote, sparsely populated areas, we can visualize the health center, a modern building to house the public health department and the offices of physicians and dentists. The health center would also provide, for the common use of all practitioners, the expensive equipment, such as x-ray machines, which can be used most economically by groups.

Interchange of information and skill is fundamental in the operation of such a system. Patients requiring major surgical measures would be sent to the district hospital. Rare and difficult cases would be sent to the base hospital, for complete study, for treatment or for both. Practitioners serving rural areas would have access to the training facilities of the base hospital. Expert diagnostic facilities and well-equipped laboratories would be common to every institution. Public health services would be closely related to the hospital system at each level of operation, state, regional and local.

An encouraging sign of the times is the interest of many states in just such a program. Plans for the establishment of an interdependent system of professional education, hospitals, medical care and health service have been formulated in a number of states. Initiative for the planning and operation of such a program rests with these states, but they look to the federal government for financial aid and technical consultation. The pattern of cooperation is a familiar one. It has operated successfully in the federal-state public health program and in the training of nurses. We can confidently expect that mutual effort to provide complete health and medical services for all of the people will be equally successful.

Expansion of preventive services must go hand in hand with the construction of hospitals and the provision of medical care. We expect to see all existing local health services brought up to acceptable strength, and full-time community health organizations established in every area now lacking such services. More vigorous application of control measures against tuberculosis, venereal disease and malaria will substantially reduce the volume of illness. Present deficiencies in the nation's sanitary facilities will have to be made to meet the requirements for healthful living. Adequate sanitation for cities, towns and farm homes would reduce still farther the water-and-milk-borne diseases.

Past accomplishments in these traditional public health fields encourage the development of new activities in local health agencies. One of the most important of these is dental service for children and other priority groups of the population.

There is a public health job for the dentist to do, working either part-time or full-time in public service. In this war, as in the first World War, dental defects have ranked high as causes of rejection for military service. Our efforts in the future must be to secure maximum physical fitness for the children and youth of the nation. We can anticipate the operation of complete dental service programs for children—possibly also for pregnant and lactating women—either in local health centers or in schools.

No national health program can fulfil its promise without continued search for new knowledge. National support of public and private research should be augmented, through grants-in-aid to scientific institutions. Even modest expenditures for research in health and medical science yield results out of all proportion to the financial outlay. A few thousand dollars spent by the National Institute of Health since 1930 made it possible for H. Trendley Dean and his co-workers to demonstrate a fact suggested by earlier investigators, that the presence of fluorine in drinking water is the cause of one dental disease, mottling of the enamel, and the preventive of another, dental caries. Reduction of dental caries by 40 per cent, which now seems possible, will save the nation millions of dollars annually. One of the first efforts in a national health program should be to establish coordinated research programs for further intensive research upon oral and dental disease.

As I have said earlier, we shall need a vastly enlarged professional army to carry on the diverse activities of a national health program. To render adequate dental care, we shall need several times the number of dentists now available. Training of personnel is an immediate need. To do the job, we shall have to create more schools of dentistry and expand those already in existence. Recruitment of well-qualified dental students will undoubtedly be aided by the Government's program of education for war veterans.

The shortage of dental manpower is so acute that the long-term program of recruitment and training must be supplemented by other measures. In order not to waste professional skill, a con-

siderable number of oral hygienists and technicians should be recruited, trained and their skill used under the supervision of dentists.

Modern technics for the elimination of pain, plus modern dental equipment, make it possible for the existing and future supply of dentists to render more dental care.

In earlier generations, European countries surpassed the United States in medicine, but dental science and art in our country always has been in the forefront. The dental profession in America surpasses that in all other countries, both in number and in qualifications. Our aim should be to increase the number as well as to create opportunities for rendering service to a larger segment of the population than now can get dental care.

As Wells and other dentists took the lead in exploring new fields in their profession, so American dentistry is advancing toward a solution of social and economic problems in dental health. I refer, of course, to the statement recently adopted by the American Dental Association. The Association's proposals for dental health for the American people are closely related to plans for a comprehensive national health program. They comprise, as you know, provision for research, dental health education of the public, dental care for all of the people and participation of the Association in planning for dental programs. The Public Health Service is in complete accord with the progressive and forward-looking policy of the Association. We anticipate a close partnership between the dental profession and government agencies—federal, state and local. The objective will be to work out plans for common endeavor, leading to adequate dental service for all the people of this country.

The several elements of a national health program parallel the proposals of the Association for dental health. Provision of adequate personnel and facilities, distributed according to the need of the public, is the first consideration. Financial assistance should be provided for the expansion of professional training facilities and for the costs of tuition.

Dental service for children is an integral part of the expanded public health program. Augmented public support for research is inherent in the national health program. Finally, financial and professional assistance to the states in the development of medical care programs is proposed. It is hoped that, despite the limitations of resources for dental services, many states will consider the development of complete dental care programs for adults as a part of their medical care plans.

Dentistry is a vital element in a national health program. Viewing the past and the future a century after Wells' discovery of anesthesia, we can speak with pride of the accomplishments in health and medical science. From the same point of vantage, we can, and must, plan for future accomplishments. The enthusiasm which imbued health pioneers of an earlier day has captured the minds of the professions and the public. In part, that interest has been stirred by scientific advances as dramatic as the discovery of anesthesia. The impetus for better health, however, springs from a deeper emotion. The grief and suffering caused by the war—the painful sacrifices made to guarantee our freedom—have created a yearning for something more than peace. The peoples of the world long for peace, but peace in a life more secure, richer in opportunities for health and happiness than they have ever known. As we work with our Allies for world peace, we shall, at the same time, go forward in a cooperative enterprise for national health. In so doing, we shall demonstrate the democratic principle of common responsibility for the common good.

DENTISTRY, INTERNATIONAL AND NATIONAL, PRESENT AND POSTWAR

W. H. Scherer, D.D.S., Houston, Texas

THE problems of human welfare are interlocking ones. The success of any social service program that is planned for the future will depend entirely on whether the interrelationships are recognized. Present needs and future desires were forecast in trends that began to take shape in the early twenties. Today, government, business, labor and other divisions of society are decidedly interested in studying the problems of human welfare. It is evident that civilization is slowly coming of age.

While the present slaughter on the battle fields seems to deny government's interest in welfare, this is a part of the evidence of civilized man's desire for emergence as a free man in a protected society. During my forty years in dentistry, it is with gratification that I have observed Dentistry's rapid evolvement toward its objective. Now it is recognized fully that dentistry is a part equal in importance to every other part of a whole human welfare program. I need not recall for you the significant discoveries that have been made in the science and art of dentistry, which have brought dentistry to its present state of perfection. With this truth established, let us proceed to project dentistry into our present needs and into our plans for the future in the whole field of human progress.

THE INTERNATIONAL PICTURE

It is with common consent that man has been privileged to look to his own doorstep before looking to that of his neighbor. Unfortunately, some of us have looked no farther. The devastation that is being produced by this war is beyond the comprehension of man. The vastness of destruction in human life, property and morale is beyond the scope of human understanding. The task of meeting the needs of man in the future, while gigantic, will not be of such consequence as the task of preparation for and carrying on of the war since, in the rebuilding process, there will be the satisfaction that comes with the pride of accomplishment. Because of the immensity of the job that lies ahead, it is essential that organization for work on a world-wide basis should be begun now.

In no field of human welfare can democracy be expressed better than in the field of health. Democracy, while facing its increased challenge, also is offered its greatest opportunity. As Rowlett has so aptly said, "Democracy has the opportunity to create a great international social order after the war which shall serve honestly and resolutely the forward march of the common people in all lands toward their just and true inheritance."

On an international basis, dentistry long ago made world-wide contributions in the field of dental science through the Fédération Dentaire Internationale. It seems wise and logical that this organization should be looked upon as the one which will make plans on a world-wide basis for the part that Dentistry should play in the reestablishment of a world-wide social welfare program. The American Dental Association, through an international committee, should cooperate with the Fédération Dentaire Internationale.

Read at the Greater New York Dental Meeting, December 6, 1944.

Gies has said "Dentistry is an art based upon a science. It is an integral part of the health service of the community being directly concerned with the teeth and the surrounding oral tissues and indirectly with the whole of the rest of the body." It is essential, then, that any program which is planned in dentistry should have for its basis the application in its entirety of this definition of Dr. Gies'. With this understanding, dentistry will be called upon to play a greater part in the protection and conservation of human resources than it has ever done before. This point of view makes it clear that the two leading health service professions, Medicine and Dentistry, are inseparable, since the services of the two professions have the same objective. I like the way Rowlett puts it: "Dentistry should therefore be master in its own house and Medicine master in its own house, with no gate crashing on either side."

As a basis for work, then, the American Dental Association, it is my belief, should coordinate its activities with those of the Fédération Dentaire Internationale in the early establishment of an international dental health commission, whose responsibility shall be to develop as quickly as possible a program of service in cooperation with the professions in the war-torn countries. According to Rowlett, "America is the only country that can send teachers and clinicians (to devastated Europe), and such a mission would be of tremendous value to the whole world." I agree with Rowlett also that a two-phased program will be necessary: (1) an emergency program looking to the immediate needs for the relief of pain and suffering, the treatment of acute diseases of the mouth tissues and a preliminary educational program in the basic principles of mouth health, and (2) a long range program that will look toward the rehabilitation of the professions in the war-ridden countries and the establishment of permanent programs in mouth health with long-range planning in mouth health education. This phase of the program should include a wisely planned program for the restoration of the teeth of children. Reports from the countries that are involved in the war are most discouraging. The mouths of the majority of the people are in a deplorable condition, and there will be need for immediate attention of a cursory nature. For this purpose, highly portable equipment should be developed. The highly transportable trailer equipment that has been developed by the United States Army may be applicable to this program of field work.

The International Dental Health Commission of the Fédération Dentaire Internationale would gain considerable information from the preliminary program as to the nature of the work that should be planned for the long-range program. No doubt the international meetings for the interchange of scientific ideas that have been held in the past could again be held.

Asia presents an even greater dental problem than Europe. There are fewer than 300 trained dentists in China, according to David S. Dai, head director of the dental public health program of China. These dentists are called upon to serve a population of more than 400,000,000—more than 1,000,000 people to one dentist. In China, we can expect an enormous awakening to follow the war. Our planning must include consideration of China's dental problem and methods to aid her to solve that problem.

Prior to hostilities, South and Central America depended largely upon Europe for support, trade and guidance. The United States enjoyed little consideration from many of our southern neighbors. Since the war, the United States has endeavored by every ethical means to improve her relationship with other Pan-American countries. We have been partially successful—not wholly so. Den-

tistry, particularly through the activities of the International Relations Committee, has made a notable contribution to more cordial Pan-American relations.

After the war, these relationships must be further improved. Our sister countries have much to learn from us. We have much to learn from them. It is important in our postwar planning for Dentistry to devise means and methods of improving our relationships with dentists and dental societies in South and Central America.

There are no fields in human relations where order can be established out of chaos so quickly as through the health service professions, since, from their nature, their interchange of ideas never stops. There is a common meeting ground for those scientists in the health service professions where their intellectual attainments rise above the level of materialistic desires. On this level of humanitarianism, they are not aware of the avariciousness of the despot.

THE NATIONAL PICTURE

I have purposely stated briefly at first the problems that confront us in international rehabilitation so that we can look upon our problems with a feeling of thankfulness that we have been spared the horrors of a destructive war on our own shores. The pinch of food and gas rationing, the overcrowding of transportation facilities and housing accommodations and the rise in rates of taxation have marked the extent of our inconveniences, which are small when we consider the anguish suffered in many homes in the loss of dear ones. This then should minimize, to a great degree, our concern over the problems that need solution here. It is with pride that I point to the cool deliberation that has been given to the problem of social dental needs by the guiding officials of the American Dental Association over the past several years. Of all the health service professions, Dentistry was first in appointing a body to study ways and means to provide better health service and service to more of the population by providing a council on dental health. The Council on Dental Health, under able leadership and with considerable energy, made a careful study of the existing dental health needs before making proposals that would meet these needs. The dental health program which they offer in the form of a statement prepared in collaboration with the Committee on Legislation and the Committee on Economics is a cautious one, and a long range one. It is one from which a start can be made to meet the responsibilities of a matured dental profession. All dentists recognize the great need of the people for dental health service. They recognize also that the approach to the relief of these needs must be a rational one and not one that it would be impossible to carry out. There is no single stroke program. The failure to meet promises has been the downfall of programs in other countries. It has taken more than 100 years to reach the level of dental health service that we have attained at the present time. It may be presumed that it will take many more years to consummate a program of dental health care on a voluntary basis for all of the people that will approximate our present understanding of adequate care.

More than 10,000,000 young fighting men have been indoctrinated with the value of mouth health. These men, who will be the American leaders of tomorrow, will carry over into civilian life much of the health instruction that they have had during the war. By actual experience, these young men have learned the value of mouth health, and many of them will do their utmost to maintain a healthy condition of the mouth.

Civilian war workers have learned the same lesson. Dental offices are filled with patients who, for the first time, have experienced dental care. They too

will wish to continue the services for themselves and their children long after the flush of wartime salaries has ceased. The demand for dental health and dental health service has been created. How can this demand be met?

The Council on Dental Health of the American Dental Association, in studying this over-all problem, has broken it down into a number of component parts. Perhaps by solving each segment separately and fitting the pieces together, a satisfactory solution of the whole will be attained. One of the most important problems that demand solution is the supplying of dental care to those in the low income bracket. The Low Income Committee of the Council on Dental Health has made an exhaustive study of this phase of our dental social relations. The report of this committee will appear in THE JOURNAL in the near future.

Of equal importance are the matter and method of supplying dental service to the great mass of middle-class people—those that form the body of our nation; those who always have and always will pay their own way, who want independence, even at the expense of security; the type of people that America is proud of because they are American—the type that we must cultivate in order to assure Americanism for the future.

Will a voluntary prepayment plan help them to secure the dental service that they need? The Payment Committee of the council believes that a plan of this kind is worthy of consideration and trial. It has perfected the details of such an experimental program and has recommended that it be tried out in one or more communities. If successful on a small scale in one area, it may prove satisfactory in many and larger areas. This may solve another phase of the over-all dental social problem.

A third segment, and one which is bound to assume great proportions in the immediate future, is that of industrial dentistry. Industrial medicine has had a phenomenal growth during the past twenty-five years. Industrial dentistry is still in its infancy. The Industrial Dental Committee of the Council on Dental Health is endeavoring to mold the pattern of its growth for the benefit of future industrial workers.

A fourth segment of the Council's study concerns itself with dental programs for children. Unlike those previously mentioned, this is by no means new. Dental programs for children have long been advocated by the American Dental Association and, through the Association and state dental societies, much progress has been made.

DENTAL RESEARCH

We are familiar with compulsory health programs that have been submitted to Congress for study during the past few years. These programs have been based primarily upon a social security basis, with the emphasis upon service. The most effective means by which the problems of dental disease can be met is research. It seems, therefore, that Congress, in its endeavor to meet altruistically the greatest dental health problem, stands ready to make appropriations for research in dentistry; yet two bills that have been introduced into Congress in recent years have failed to pass.

These bills provided, first, for the establishment of a dental research institute with an appropriation of $750,000 and, second, for an initial appropriation of $100,000, to be made for the maintenance of the research project. This sum would be increased annually at the rate of $100,000 until an annual sum of $500,000 is appropriated by the Federal Government. This is a small request as compared with the vastness of the need. All that is needed is the appropriate federal legislation. This is the first step toward a rational federal program for the control of dental disease.

DENTAL HEALTH EDUCATION

The joint committees' second recommendation embraces the establishment of a coordinated program of dental health education at all levels—community, state and national. The strength of a democracy lies in education. It is presumed that a democratic nation shall rise to its needs as it is made aware of these needs. If the people of the country have not as yet responded to the need for dental health service, it is to be presumed that we have not yet made them aware of the seriousness of the need. The responsibility is ours. It is evident that we have failed to meet it in the past.

It is essential that the program of education be nation wide. The program would be an expensive one for the dental profession to assume and it is not the responsibility of the profession to assume the cost. Here, the community, the state or the federal government should be called upon to subsidize the program of health education. It has been estimated by the joint committees that it would require $3,000,000 annually to carry on the educational program.

DENTAL CARE

Since there is no known preventive measure for the two major causes of the loss of teeth, it seems advisable that we emphasize the programs for the treatment of the mouths of children because we know that, by early and persistent treatment, we can decrease materially the need for dental service later. The emphasis in children's programs in the past has been placed upon the school-age child, because of the ease with which children of this age can be reached. It is hoped that, more and more, programs in public health departments can be developed that will increase the opportunity to care for the preschool-age child. It is increasingly important that the program for the preschool-age child be developed so that all children in the United States may have dental service made available to them. The Canadian program will be an interesting one for us to observe, provided it is adopted by the Canadian government. The Canadian Dental Association has proposed to the government that a compulsory program be established for children up to 16 years of age. The joint committees of the American Dental Association state that an "effective national program for dental health can be erected on three fundamental points: (1) intensified research to discover the causes of dental diseases, thus making preventive measures more effective and decreasing the amount of dental disease in the country; (2) a national program of dental health education to bring a knowledge of present methods of prevention and control to the attention of all the people, and (3) programs for dental service, particularly for children, as the greatest amount of prevention and control can be accomplished in this age group."

These three points are so integrally related in their influence on dental health that no dental program should ever be established without including each of them in its proper relation.

These are some of the phases of the over-all dental social problems that must be faced and solved by the profession in the postwar period. Each step in the solution will bring us one step closer to making dental service available to all.

MEMBERSHIP

There are at present 58,000 members of the American Dental Association. We should have 60,000 members at the close of next year. Whether this membership remains permanent or not is of great concern. This record has been achieved under largely favorable circumstances: a continuous rise in the national income initiated by the war, and the Army and Navy requirement that, in order to be eligible for a commission, a dentist must

be a member of the American Dental Association. It may be expected that, in the postwar period, our membership will decline in a direct ratio with the decline of the national income. The situation with respect to the dental officers in the armed forces is truly alarming. According to overwhelming evidence at hand, many dental officers consider that the American Dental Association has not given them the support to which they are entitled. Our records show that not more than half of the dental officers are members of the American Dental Association, and we fear that, with the propaganda that is directed toward them by agencies other than the American Dental Association, the percentage will continue to decline. In order to counteract the effect of a major reduction in national income and also the dissatisfaction that is currently rampant among dentists in the armed services, we must acquaint all of our members with the truth regarding the innumerable activities of the American Dental Association and convince them that membership is a necessity and not a luxury.

DENTAL EDUCATION

In the solution of these problems, other correlated problems present themselves, one of which is dental manpower. Prior to the war, certain sections of the United States were oversupplied with dentists; other sections—and there were far too many of them—were undersupplied. This disproportionate distribution of dentists wrought a serious hardship on both patients and dentists. Due consideration must be given to this problem in our postwar planning to rectify the situation in the future.

The anticipated desire on the part of the public for increased dental health service will place an additional burden upon our already overtaxed profession. Dental manpower must be increased. Before the war, the number of men entering the profession scarcely balanced that of those leaving by death and retirement. Our postwar planning must give great consideration to methods and devices that will encourage the entrance of more and better-qualified entrants into the profession.

The Council on Dental Education of the American Dental Association is giving serious thought to this matter. It envisions large responsibility upon all agencies of education in meeting the enlarged dental demands of the public. Young men and women of proved ability and scholarship, and with the will to serve their fellow-men in a useful and honorable profession, must be recruited for the study of dentistry. Faculties of dental schools must be enlarged and strengthened, equipment must be modernized and housing for dental schools worthy of the conduct of a university discipline must be provided. The public must be made to see that dental education as a broad health service must be generously supported.

Not only must we increase our dental recruits and improve their education: we must also give consideration to methods for improving the technics and procedures of those of us now in practice. Refresher, postgraduate and graduate courses must be enlarged, to meet not only the needs and demands of returning veterans, but also inevitable enduring needs. Auxiliary personnel and the services rendered by them must be studied and regulated. The services of the dental hygienist, the dental assistant and the dental technician must be geared to those of the dental profession itself for the ultimate good of the public. The efforts of the Council on Dental Education to coordinate teaching and examining, successfully undertaken before the war in congresses on dental education and licensure, must be renewed. It seems clear that society desires greatly in some form to extend dental care. In this issue, dental education for members of the profession and for those in auxiliary serv-

ices will naturally play an important role.

REDISTRIBUTION OF DENTISTS

The Committee on Economics of the American Dental Association, as well as the Council on Dental Education, is studying the dental manpower situation. It is the opinion of the Committee on Economics that one of the major problems of the postwar period will involve the redistribution of dentists. As previously stated, the unequal distribution was critical enough before the war. Today, with the radical shifts in population resulting from the war, there is an urgent need to plan for and bring about a more equitable distribution. The complexities of this problem will become more acute as war industries close, soldiers, sailors and dental officers return and populations readjust themselves to peacetime pursuits.

OTHER PROBLEMS

The dental profession is confronted with many other problems in postwar planning. Some of these problems are intimately interrelated with problems already mentioned. Some are more remotely related. The Association must continue to increase its efforts to improve the dental service in both the Army and the Navy. In order to bring about this improvement to the fullest extent, the status of the Dental Corps in both the Army and the Navy must be improved. The Committee on Legislation of the American Dental Association has been successful in bringing about certain improvements in this respect, but further study and further accomplishments are necessary before the Dental Corps of our two war services can render the ultimate in service to the enlisted men.

Postwar dental planning entails further study and action in order to bring about an improved status of the dental divisions of the United States Public Health Service, the Veterans Administration and the Department of Indian Affairs; and possible correlation of the services rendered by those federal agencies with those rendered by the dentists in private practice.

Present and future veterans' legislation as it affects dentistry and dentists will entail considerable study on the part of the American Dental Association and particularly on the part of the Committee on Legislation. This legislation will provide certain benefits and services to which dentists and dental students may be eligible by virtue of their status as veterans. It probably will provide certain dental services to all returned veterans. How these services are to be provided, and by whom, will require study on our part. Postwar planning will inevitably include consideration of dental activities now being rendered by state boards of public health. Most of these activities are being partially financed by monies made available under titles 5 and 6 of the Social Security laws. Thought must be given to the desirability of new federal and state legislation that will permit earmarking specific funds for dental purposes. This would prevent funds originally intended for state dental divisions from being diverted to other purposes.

The Association must also increase its activities to secure funds for dental research. The Committee on Legislation of the Association is sponsoring a dental research bill which, if enacted, will provide the United States Public Health Service with funds for dental research purposes. Some of our postwar efforts must be directed toward bringing this legislation to a successful conclusion.

THE RETURNED VETERAN

The dental officer who returns from military service to his status as a civilian practitioner has primarily two major problems confronting him: (1) a suit-

able location and (2) office facilities and equipment with which to practice. Many progressive district dental societies and several state societies have been mindful of these two major problems and have made surveys of their communities and of the state by which returning dentists can be located in communities where they desire to reside with a minimum loss of time. The War Service Committee of the American Dental Association and some state societies have sent questionnaires to the dental officers that will make available to the state and local societies information concerning the desires of the officer when he returns to civilian life. The replies to the questionnaire sent out by the Southern California State Dental Society indicate that the men in service are not pleased with their prospects upon their return. A tabulation of their replies is interesting. Some of their answers are surprising. "Do you believe that your colleagues in civilian practice will insist that your patients return to you for treatment when you return home?" A large majority of these officers do not expect a return of their former patients. The "yes" answers to this question numbered 16; the "no," 127. This is a serious challenge to the high standard of ethics that we know, and it is not very flattering to us. This challenge must be met with an enthusiastic upholding of our ethical standards. Every former patient of a dentist who is now in service, for whom we have been rendering emergency service, must again become the patient of the returning dentist. These patients who may be coming to us now must be constantly reminded that our services are of an emergency nature and that it will be necessary to see his former dentist immediately upon his return to private practice. I suggest that each dentist keep a card index record of these patients so that a notice may be mailed from his office to them conveying the information that "Dr. Blank has returned from military service and will be happy to see you and serve you at his new office address." By all means, this must be done.

I have received many letters from men in service. They have described to me many of the duties in their particular theater of war. They have also described some of the professional opportunities that have been made available to them and some of the means that they are using to keep themselves abreast with the newer methods in dentistry, as well as the newer methods of war service dentistry. One letter stated that the writer had received information that the laity were having implanted in their minds the idea that their dentist would require postgraduate work or refresher courses on his return in order to render satisfactory dental service. It is improbable that the laity received such information from reading professional journals; but this letter serves to remind us that every member of the profession who has remained at home should do his best to combat the impression that dentists who are in the service are in any way inferior in skill to the men who remained at home.

Another question of interest in these questionnaires was "Do you expect refresher courses to be offered to you on your return home? Should they be sponsored by the government, dental societies or dental colleges?" The sentiment was 193 to 41 in favor of refresher courses. The officers who expressed themselves preferred that these courses be planned to prepare the dental officer to return to civilian practice. They expect these courses to be offered by the government through dental societies and dental schools.

The service men are interested in knowing how many practicing dentists there are in their former location or in adjacent communities. Of these, they want to know how many were practicing in these locations before the war; how many have recently moved into the loca-

tion; whether there has been any increase or decrease in the population of the community, and whether there are any desirable office locations. All of these questions are vital to the dentist who is in the service. I know of many communities the growth of which has been so rapid that office space today is practically unobtainable. Many of the dental officers may be interested in becoming associated with a group of professional men or associated with a practicing dentist. These men should be advised by every means possible that they should contact advisory committees of the district dental society in the community in which they are interested. They should contact also the American Dental Trades Association or independent dental supply dealers.

THE REMISSION OF DUES

The question of remitting dues for the returning dentists has been raised. One state society has remitted dues for six months and a resolution is now being considered to remit the dues for a year. This is a question that must be decided by each state society.

DENTAL EQUIPMENT

Many returning dentists will have disposed of their equipment and it will be necessary that they purchase new equipment. In my opinion, these returnees are entitled to first consideration by our government in the purchase of surplus dental equipment. It is my opinion also that the American Dental Association should exert every possible effort to prevent surplus dental equipment and supplies from going into the hands of speculators, with whom the returning dental officer would be forced to deal.

CONCLUSIONS

Dentistry is on the march. Never before in the history of the profession has there been such challenging opportunities presented to us. Rather than look upon the problems involved with undue concern, we should look at them as to be solved. I am confident that, with the aid of our dentists who return from the war, we can solve our problems in the United States and, by our wholehearted cooperation with the professions in other lands, we can aid in the solution of the dental problems abroad. This will require work—hard work—we cannot wish and dream our profession into a high character—and, paraphrasing Rowlett, "neither can we expect to achieve our ultimate objective without becoming a part of the new world order." Abraham Lincoln's warning to the Congress of the United States on the first of December 1862 is worth remembering: "The dogmas of the quiet past are inadequate to the stormy present. The occasion is piled high with difficulties and we must rise high with the occasion. As our case is new, so we must think anew and act anew. We must disenthrall ourselves and then we shall save our country."

PERIODONTAL INVOLVEMENT AND ITS MANAGEMENT

G. R. LUNDQUIST, M.S., D.D.S., Chicago, Ill.

BECAUSE mouths are habitually dirty, local accumulations of dirt, débris and bacteria are common to the lesions of dental caries and to periodontal involvements as well. Add calculus deposits to periodontal conditions and we have their most obvious difference.

Both lesions would probably be largely prevented if every mouth was kept scrupulously clean and properly massaged. As a rule, no satisfactory attempt is made to eliminate dirt, débris, etc., and so we concern ourselves with a cataloging of a multiple of variables produced by the presence of dirt.

In the case of dental caries, it is primarily the degradation of carbohydrate accumulation, which is acid producing, that seems to be at fault; while, in the case of periodontal involvements, we are confronted with products of partial protein cleavage, alkaline in effect and toxic in character when related to the adjoining soft tissue.

In the former, the production of acid results in a decalcification of tooth structure. In the latter, the alkaline effect results in toxic irritation of the adjoining gingivae. This is characterized by capillary changes—that is, dilatation and deformation—in extravascular infiltration of cellular elements and blood proteins, fluid in character. (Figs. 1-5.) Because of dirt and trauma, these inflammatory changes tend to persist, resulting in what might be called a "lymphatic block." (Menkin.[1]) As a rule, nothing is done to check them even though they appear as early as the time of eruption of the teeth.

Tissue fluids and extravascular cells which have become extravascular because the gingivae have been subject to repeated attacks of inflammation or long continued mild irritation can be returned to blood vessels only via the lymphatics. To move such fluid through these vessels, an outside force is necessary. Motion and massage are effective means of promoting lymphatic drainage. Menkin[1] has demonstrated increased capillary leakage or permeability in inflammation and produced evidence that a dye injected into an area of sterile inflammation (aleuronat) remained in the site of injection and did not travel to regional lymphatics. He explained his findings on the basis of a local deposition of fibrin and thrombosis of lymphatics. Drinker and Yoffey[2] contend that capillary lymphatics in swollen tissue are widely distended because these vessels are attached to surrounding tissue by fine fibrils and, as swelling occurs, fluid passes freely into them and pulls them open. They point out that fibrin contracts, with the result that the formation of solid clots capable of blocking dilating vessels against a heavy head of lymph flow (fluid accumulation) is not easy, and may readily fail if inflammatory swelling is really great. They suggest that as inflammation progresses and tissue tension

1. Menkin, Valy: Dynamics of Inflammation. Experimental Biology Monographs. New York: Macmillan Company.

2. Drinker, C. K., and Yoffey, J. M.: Lymphatics, Lymph and Lymphoid Tissue. Harvard University Monograph in Medicine and Public Health No. 2. Cambridge: Harvard University Press.

reaches an equilibrium, water and solutes of a small molecular size, but possibly of considerable toxicity, may be absorbed by the blood capillaries, whereas molecules of approximately the dimensions of serum globulin and those of larger size must either experience lysis, and so acquire small molecular dimensions, or must depend for their removal on lymphatic drainage or on phagocytosis with subsequent cellular migration.

Drinker and Yoffey's[2] analysis of lymphatic block on the basis of the size of the globulin molecules readily explains the lymph block so often found in swollen gingivae in children's mouths.

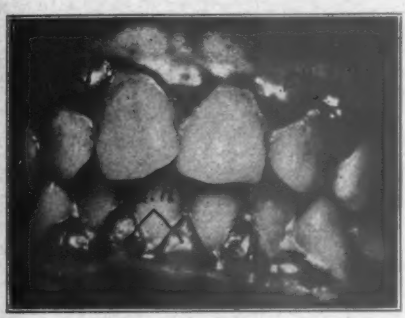


Fig. 1.—Edematous hyperplasia (*E.H.*). Hyperplastic lymphedema-accumulated extravascular cellular elements and fluids are expressed in this lush type of overgrowth.

Here, we find the usual dirt accumulation on the tooth and in the gingival crevice, accompanied by an area of lush fluid-containing hypertrophied gingiva. (Fig. 1.) Such conditions develop slowly and are not the result of a single inflammatory reaction. Hence, as the condition develops, the transition from a lymphedema (Fig. 1) to a progressive fibrosis is noted (Fig. 6). Such a lymph block uncoupled with infection requires years to establish substantial overgrowth. When infection is added or such a drug as dilantin sodium is administered, an intensification and speeding up of the process is noted. (Fig. 7.)

Such overgrowth is of a normal type of tissue and is induced when the extravascular cells and fluids ordinarily removed by the tissues are left *in situ*.

It should be clear that capillary lymphatic drainage is normally rather sluggish and that the lymphatic capillaries are essentially the servant of the normal-moving human organism. Muscular activity is of prime import in the movement of capillary lymph. It follows that, without proper massage by food in mastication or the interposition of such procedures as artificial massage to produce motion, the extravascular elements will continue to be left *in situ*. This accounts for the chronic characteristics of periodontal conditions.

It should be remembered that lymph from normal skin owes its composition to transudation from capillaries in the skin, but lymph collected from mucous membranes also contain fluids, solutes and microscopic particles that have reached the lymphatics from the surface. The gingival crevice with the series of breaks in continuity of the epithelial lining of the soft tissue sides of a periodontal pocket makes this abundantly clear. (Fig. 8.)

In children's mouths, then, we are confronted with little more than a detachment of soft tissue from the crown of the tooth accompanied by a substantial overgrowth of tissue lymphadematous and later fibrous in character.

In the adult, the detachment of soft tissues also includes separation of soft tissues from the root surface. The crevice is deeper. The toxic irritation of the adjoining soft tissues is more pronounced and oft repeated. Often, the edematous fluid accumulation is less marked, and the extravascular cellular infiltration is greater. Treatment in both cases requires removal of the semisolid grayish white débris covering the gingival aspects of crowns and roots of teeth; but treatment requires more than this. Largely because mouths are habitually

dirty, such accumulations constitute a source of long-continued toxic irritation, resulting in repeated attacks of inflammation. The lymphatic block accompanying this process must also be dealt with. Hence, the local problem is twofold.

cause them to be pathways for the removal of foreign material.

TREATMENT

The dirt, semisolid mucous particles, must be removed after each meal to prevent the recurrent irritation that pro-

Fig. 2.—Extravascular cellular elements and dilated capillaries.

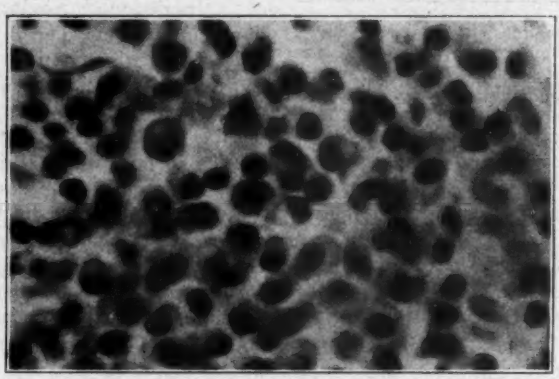


Fig. 3.—Infiltration of abundant plasma cells.

The large size of lymph capillaries and the lack of pressure difference between their contents and the tissue in which they are found make them open to influences of motion or massage and

duces the accompanying lymphatic block in the adjoining soft tissues. That this is an absolute necessity may be stated without qualification. Dentists and their patients have become so accus-

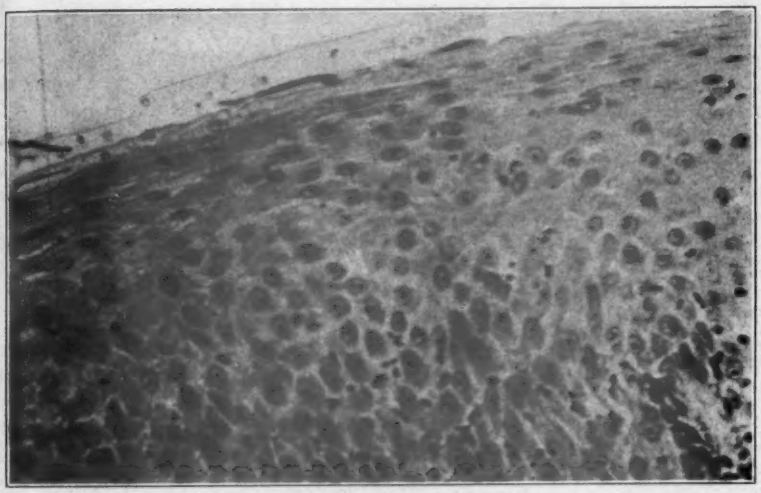


Fig. 4.—Leukocytes infiltrating epithelial cover of gingivae.

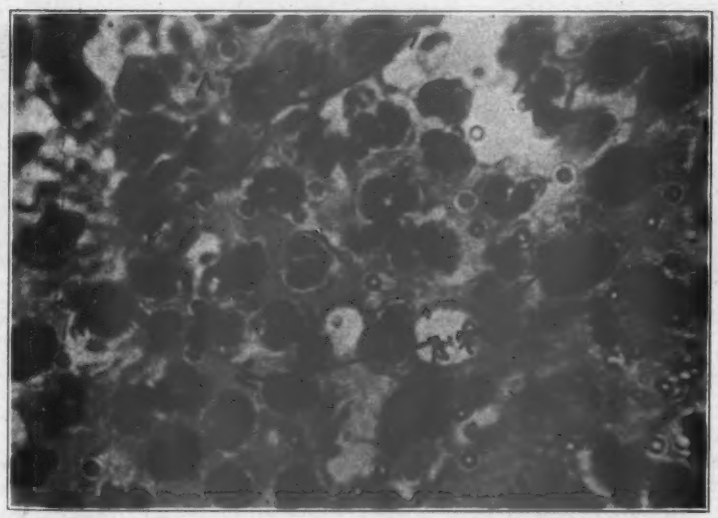


Fig. 5.—Dilated lymphatic capillary filled with polymorphonuclear leukocytes.

tomed to the universality of dirt in the human mouth that the dentist makes and the patient accepts restorations in its presence.

This is unfortunate since prevention is seldom thought of before the consequence of such neglect is well-advanced. The dentist seldom teaches his patient how to clean or massage his teeth and their investing tissues effectively. It follows that most toothbrushing is ineffective. It is done at the wrong time, and is usually improperly performed, so that today it has little value except for

the fact that it has a pleasant taste.

If we continue to neglect to follow proper cleaning and massaging methods plus occlusal adjustments, which would effectively control 90 per cent of periodontal involvements, we must try some of the effective methods of control in vogue today.

Since a periodontal pocket or gingival crevice has two surfaces, a hard tissue side—the tooth—and a soft tissue side—the detached soft tissues—the problem is obviously twofold.

TREATMENT OF HARD-TISSUE SIDE OF POCKET

1. The tooth must be effectively cleaned, as has already been stated.

2. If, in addition, the investing tissues are not equal to sustaining the

Fig. 6.—Hyperplastic overgrowth; transition from lymphedema to fibrosis. Lymphedema: edematous hyperplasia (*E.H.*); fibrosis: fibrous hyperplasia (*F.H.*).

mesiodistal, buccolingual and occlusally directed stresses, and drift takes place, the edematous inflammatory reactions that occur in the gingival and apical regions will also tend to become fibrous. I have already discussed these facts under the title of "Connective Tissue Changes Associated with Variable Occlusal Stresses."[3] In such cases, occlusal and proximal adjustments by grinding to counter these excessive leverages are called for.

TREATMENT OF SOFT TISSUE SIDE OF POCKET

1. To any one who has examined a gross or a microscopic section of gingival tissue these conditions are obvious: (a) capillary changes—dilatation and deformation; (b) extravascular infiltration, with cells, lymphocytes, plasma cells, leukocytes and fluid elements, and (c) lymphatic block. (Figs. 1-5.)

2. The extravascular elements cannot be eliminated by cleaning operations alone as the so-called dry pyorrhea cases so clearly demonstrate. They must be moved out of the tissues.

Two well-known methods are available. To prevent possible distribution of emboli, both require the removal of all

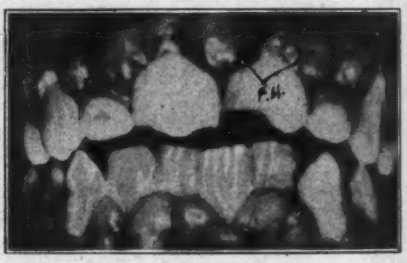


Fig. 7.—Hyperplastic overgrowth; complete fibrosis (dilantin sodium). *F.H.*, fibrous hyperplasia.

dirt, débris and calculus from the tooth surface before proceeding with the management of the lymphatic block.

The first is a method of exercising pressure on the outside such as may be employed with cotton packs dipped in an 8 per cent solution of zinc chloride or a 10 per cent solution of sodium hexametaphosphate.

The second method deals with the exercise of pressure from within, as in the use of superoxal. (Orban.[4])

3. Lundquist, G. R.: Connective Tissue Changes Associated with Variable Occlusal Stresses. J.A.D.A., 24:1577, October 1937.

4. Orban, Balint: Use of Paraformaldehyde and Oxygen in Periodontal Treatment. *J. Periodontol.*, 14:37, January 1943.

Fig. 8.—Typical illustration of chronic periodontal pocket: *A*, epithelium; *B.E.*, incomplete epithelial cover; *R.I.*, round-cell infiltration.

In both cases, pressure is exerted so that all the extravascular elements and those elements within the vascular system are forced out—through both the lymphatic and the vascular system. An anemia is produced in both cases which lasts from fifteen to twenty minutes. In the first case, the removal of the packs and pressure on the outer surface immediately results in an increase in capil-

lary permeability and a resumption of a circulating medium. (Figs. 9-10.)

In the second case, the superoxal expends itself, and again an increase of capillary permeability and a resumption of circulation are noted.

Orban suggests that the tissues be activated twelve to twenty times with superoxal to transform inflammatory tissue to normal. The addition of oxygen in the form of superoxal is supposed to have the therapeutic effect of altering the tissue and changing it to normal.

It is more probable that the effect is accomplished by the expansion of the gas (Fig. 11) in the tissue, squeezing out all vascular and extravascular elements from within and thus allowing for

Fig. 9.—Zinc chloride packs in place; anemia (*P.A.*) in gingival region.

normal restoration of vascular and extravascular elements after the anemia produced by the oxygen runs its course.

The beneficial effect is mechanical in both cases: pressure on the outer surface in the first case and pressure from within in the second case cause fluid movement. This has a beneficial effect, and all the tissue changes already described by Orban as occurring because of the use of superoxal also occur when pressure stimulation is used on the outside. (Fig. 13.)

If the pockets are deeper, and it does not seem probable that the patient will cooperate sufficiently to effect the elimination of the soft tissue side of the periodontal pocket, by the above described methods, electrosurgical, electrocoagulation or pure surgical measures may be employed to eliminate the soft tissue side of the periodontal pocket. This will at least give the patient a fresh start. It is obvious that all methods of control will fail if mouths are not kept habitually clean and properly massaged. This implies a reshaping of tissues to have deflecting contours.

Before a detachment occurs, the septal gingivae reach the position of the contact and form the floor of the buccal, labial and lingual embrasures. They have deflecting contours.

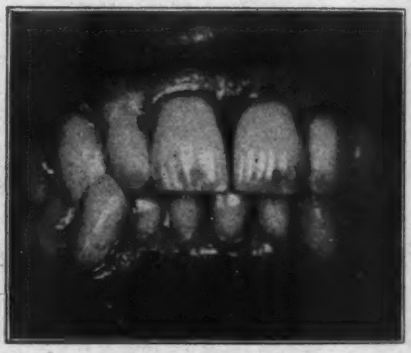


Fig. 10.—Restoration of circulation (*R.C.*) and color of gingivae after removal of zinc chloride packs.

When detachment occurs, there is a buccal or labial and lingual bulge with a hollow left below the region of the contact. (Fig. 1.) This arrangement favors food accumulation, decomposition and toxic irritation. It follows that the buccal, labial and lingual bulge will need to be eliminated. The bottom of the crevice below the contact will need to be converted to a crest or a high point if a deflecting contour is to be developed.

This can be accomplished by interposing cotton packings, which have been previously wound around a perio-

dontal membrane explorer, and then dipped in an 8 per cent solution of zinc chloride, between contact points and these buccal, labial and lingual bulges, until the tissues are blanched or made anemic. This effect lasts from fifteen to twenty minutes. On removal, a resurgence of circulation occurs, which, of course, is stimulating. Ten days later, this process is repeated.

The patient is then taught how to use the interdental stimulator, which, having been inserted interproximally, is directed toward the biting edge of the tooth as it is passed through the septal space. The extra pressure in a lingual

Fig. 11.—Microscopic specimen obtained immediately after application of superoxal. *A*, epithelium; *O.B.*, oxygen bubbles in connective tissue.

direction against the buccal bulge compresses and reduces it. From the lingual aspect, pressure is exerted in like manner against the lingual bulge, blanching and

Fig. 12.—Use of interdental stimulator; showing position.

reducing it. As a consequence, each day the patient does exactly the same things, in a modified way, that pressure activation of packs accomplishes. (Fig. 12.) Three weeks later, the sealing and pack procedure are repeated.

Thereafter, the cumulative effect of proper daily massage is probably of greater value than the occasional visit to a dentist. It follows that the patient can be taught largely to care for his own case with an occasional lift by the dentist every three, four or six months, according to his requirements.[5]

The general or systemic factors, plus the age picture, will be discussed in relationship to the foregoing in a later paper.

CONCLUSIONS

1. Dirt and débris are common to both caries and periodontal involvements.

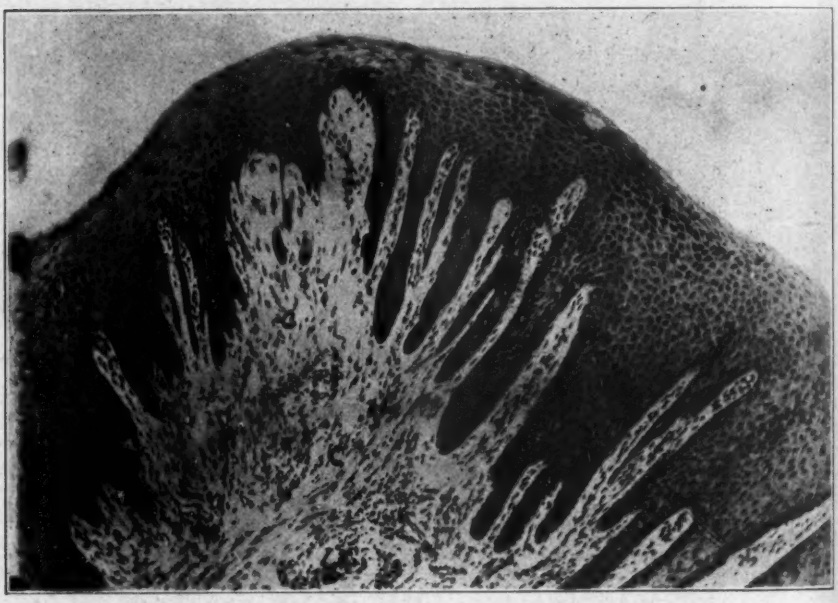


Fig. 13.—Restoration of normal gingivae with intact epithelial cover of now normal connective tissue. Infiltration of extravascular elements, fluids and round cells noted in Figures 1-5 is absent. *A*, epithelium, thick, continuous and hornified. *B*, fingerlike processes projecting into connective tissue. *C*, connective tissue free from round-cell infiltration and consisting of new, young fibroblasts.

5. Starling, E. H.: Fluids of Body. Chicago: W. T. Keener and Company, 1909.

2. When the local condition is acid, decalcification of the tooth occurs.

When the local condition is alkaline, toxic irritation of investing tissues occurs.

3. Since a gingival crevice has two surfaces, a hard, the tooth, a soft, the adjacent soft tissues, treatment of both requires attention as follows: (a) prophylaxis and adjustment of excessive occlusal stresses, which are in order as regards the tooth, and (b) methods of massage and the production of motion, which will eliminate extravascular elements through normal channels; namely, the lymphatic capillaries.

Electrocoagulation, electrosurgery or pure surgical measures will eliminate the soft tissue side of the pocket in its entirety. This also allows for a normal restoration of circulation as the new gingivae develop.

4. All methods will fail unless patient and dentist cooperate in the maintenance of a healthy tooth and investing tissue by cleanliness and massage, producing healthy deflecting gingival contours.

DENTAL SURGERY AS A PROPHYLACTIC IN SUBACUTE BACTERIAL ENDOCARDITIS

PRELIMINARY REPORT OF SEVEN CONSECUTIVE SUCCESSFULLY TREATED CASES*

MATTHEW D. LEVIN,† D.D.S., New York, N. Y.

SUBACUTE bacterial endocarditis is an active inflammatory process involving the heart valves and sometimes the lining of the chambers of the heart. The disease seldom attacks a normal cardiovascular system, but rather one damaged by previous disease, usually a rheumatic infection, or one the seat of a congenital anomaly. The causative organisms are usually of low virulence, *Streptococcus viridans* being the etiologic agent in more than 90 per cent of cases.

The origin of the infection is obscure, but it is probably metastatic focal infection and may be latent or active.[1] Clinically, the portal of entry is usually in or about the upper respiratory tract, the tonsils, devitalized teeth and retained roots. The disease often follows apparent grippal infections of the upper respiratory tract, the extraction of teeth[2] or removal of the tonsils.[3] O'Kell and Elliott[4] observed that dental extraction was followed by transient bacteremia, usually of a *Streptococcus viridans,* in 75 per cent of patients with septic mouths, and in 34 per cent without obvious oral infections. Such transitory bacteremia, while of no significance in normal persons, may in those having previous valvular damage be responsible for a bacterial endocarditis with the formation of thrombotic vegetation. Ulrich,[11] Hartzell and Henrici,[12] Fraser,[13] Appleton,[14] Rosenow[15] and others made bacteriologic studies of pulpless teeth and periapical areas in otherwise healthy persons, revealing that, in 75 per cent or more,

*Study evolved as part of the treatment of subacute bacterial endocarditis in conjunction with Drs. Leo Loewe, Philip Rosenblatt *et al.*

*Read before the Staff of the Dental Department, Jewish Hospital of Brooklyn, May 9, 1944.

†Attending oral surgeon, Dental Department, The Jewish Hospital of Brooklyn.

cultures of *Streptococcus viridans* were obtained. In lesser numbers, *Staphylococcus aureus* and *albus, Neisseria catarrhalis, Streptococcus haemolyticus,* diphtheroids and other mixed organisms were found.

Subacute bacterial endocarditis has been considered a fatal disease, only a few authentic cases of recovery, spontaneous or otherwise, being recorded. The disappearance of vegetation in experimental thrombotic bacterial endocarditis[5] has been accomplished by the continued use of a suitable chemotherapeutic agent together with an anticoagulant. The clinical application of this principle in human subacute bacterial endocarditis has been disappointing. Arsphenamine, sulfonamides, sulfapyradine alone or in combination with heparin and recently penicillin alone have been tested. The mechanics of therapy were cumbersome, the toxic reactions were severe even for an otherwise fatal disease and the successes few.[6] Efforts at treatment with the sulfonamides have been mostly abandoned. The early experiences with penicillin were

Fig. 1 (Case 1).—Upper right lateral incisor.

Fig. 2 (Case 1).—Upper right first bicuspid.

Fig. 3 (Case 1).—Upper left lateral incisor root.

Fig. 4 (Case 1).—Upper left second molar.

Fig. 5 (Case 1).—Lower right second molar.

Fig. 6 (Case 2).—Upper left second bicuspid.

also disappointing. By employing variations in previous technics, Loewe, Rosenblatt, Green and Russell[8] were able to report seven apparently successfully treated cases. It is in this association that this study and investigation were made.

An attempt was made to establish a working plan for the elimination of foci

Fig. 7 (Case 2).—Lower left second and third molars.

Fig. 8 (Case 3).—Upper right second bicuspid root.

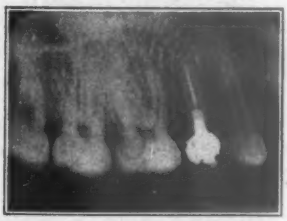


Fig. 9 (Case 3).—Upper left second bicuspid root.

of infection in the mouth, based upon the following concept, for the purpose of preventing recurrence of the disease:

1. That (a) devitalized teeth, with or without proper root-canal fillings and with no roentgenographic evidence of parietal or periapical infection are potentially infectious; (b) devitalized teeth with roentgenographic evidence of pathologic areas are potentially infectious irrespective of previous root-canal therapy, and (c) any teeth with low electrical responses to the pulp tester and

Fig. 10 (Case 4).—Upper right lateral incisor.

Fig. 11 (Case 4).—Upper left central incisor.

Fig. 12 (Case 4).—Lower left second bicuspid and molar roots.

breaks in the peridental membrane are potentially infectious.

2. That pyorrheal pockets, cysts, root remnants and other oral pathologic

areas are potentially infectious and may be a causative or contributory factor in the progress or recurrence of subacute bacterial endocarditis.

3. Therefore that, by the eradication of any primary dental focus of infection, a basically sound prophylactic measure is attempted for removal of the cause or the prevention of the progress or recurrence of the disease.

Fig. 13 (Case 4).—Lower right first molar.

Fig. 14 (Case 5).—Upper right first molar.

Fig. 15 (Case 6).—Lower left second bicuspid.

In the treatment as reported by Loewe, Rosenblatt *et al.*,[8] the conjoint chemotherapeutic, anticoagulant attack consisted of the use of penicillin as the antibacterial agent to destroy the bacteria and heparin as the antithrombotic agent for the prolongation of the coagulation time of the blood in order to prevent thrombus formation. It is not known whether penicillin is principally bactericidal[9] or bacteriostatic,[10] but it is unquestionably the most powerful antibacterial agent for general use known to date. It is employed to control the infectious phase of the disease process. Heparin is used to prevent the further deposition of blood platelets on the vegetations that afford the bacteria a protective covering and favor their continued growth.

Fig. 16 (Case 7).—Upper right central and lateral incisors.

Fig. 17 (Case 7).—Upper left central and lateral incisors.

In either instance, the penicillin-heparin therapy could be only arrestive and not curative, nor could any patient be considered ready for discharge until all possible foci of infection had been removed. First and foremost, the teeth

and their environs must be considered as possible offenders.

The sensitivity of the organisms to penicillin was determined. It was found that the bacteria were inhibited within dilutions ranging from 0.007 to 0.01 Oxford unit of penicillin per cubic centimeter. The daily dosage of penicillin in the treatment of these cases varied from 40,000 to 200,000 Oxford units and the total ranged from 867,920 to 7,890,340 Oxford units. The heparin dosage approximated 300 mg. every second day when given subcutaneously, and 200 mg. daily when given in venoclysis. Blood coagulation time was checked daily and a reading of thirty-sixty minutes was regarded as indicating satisfactory anticoagulant activity.

Fig. 18 (Case 7).—Upper right third molar.

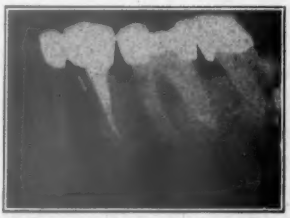


Fig. 19 (Case 7).—Lower right second bicuspid.

METHOD OF DENTAL SURVEY

The patients had all been subjected to one, two or more cycles of penicillin-heparin therapy.[8] When they were clinically improved as evidenced by normal reactions to clinical and laboratory tests, such as blood culture, temperature, pulse and respiration, a complete oral examination was made. This included clinical examination of the soft tissues, the teeth, electrical pulp testing of all remaining teeth and comprehensive roentgenographic examination. All devitalized teeth, irrespective of other findings, were considered potentially infectious. All teeth with significantly low electrical responses to the pulp test and breaks in the peridental membranes were also considered suspicious. When all data had been correlated, preparations were made to remove all devitalized teeth, suspicious teeth, roots and other possible oral foci of infection.

The régime for this procedure was as follows:

1. The operations were scheduled in the mornings, usually between 8:00 a.m. and 10:00 a.m., in the operating rooms. Patients were considered most rested at this time.

2. All patients were given a light breakfast.

3. The day before, the day of and the day after the scheduled extraction or the surgical flap procedure, which was carried out in four of the seven cases, 100,000 Oxford units of penicillin* dissolved in 24 cc. of physiologic solution of sodium chloride was given in fractional doses by the intramuscular route.

4. Blood cultures were made the day before and the day after the operative procedures.

5. The night before, a sedative, usually pentobarbital sodium, 1½ grains, was given orally.

6. One hour before an extraction or operation, morphine one-sixth grain and scopolamine one one-hundred-fiftieth grain were administered hypodermically.

7. All surgical procedures were performed under local infiltration, block or

*All penicillin used was supplied by Charles Pfizer and Co., Brooklyn, N. Y.

conduction anesthesia with 1 per cent monocaine without adrenalin. (Monocaine is preferred as a local anesthetic because there is very little, if any, fall in blood pressure with this drug.)

8. Cultures were taken from the sockets after removal of the tooth or teeth and from portions of the roots. The material thus obtained was streaked upon blood-agar plates, incubated at 37.5° C. for from eighteen to twenty-four hours, and the bacterial flora identified. (All bacteriologic smears and cultures were taken and identified by M. Russell.[8])

9. After the tooth or teeth were removed, sterile gauze strips, dipped in a solution of penicillin containing from 5,000 to 10,000 Oxford units to the cubic centimeter, were inserted in the sockets as a dressing. The areas were also swabbed topically with a similar solution. Sutures were placed where indicated.

10. These dressings were left *in situ* for twenty-four hours and then changed every twenty-four hours for three consecutive days.

11. The postoperative care included:

a. Retention of a gauze pack over the penicillin dressing for one hour to arrest hemorrhage; this to be replaced for the same period of time if bleeding were persistent.

b. Sedation for the relief of pain if necessary, usually codeine one-half grain every three hours or pentobarbital sodium 1½ grains.

c. Application of an icebag over the area of operation, twenty minutes on and one hour off for the first twenty-four hours after operation if swelling appeared.

d. An all-fluid high-caloric diet for the first day, soft diet the second and regular diet the third day and thereafter.

e. Any antiseptic mouthwash to be used only after meals, none the first day.

REPORT OF CASES

CASE 1.—L. O., a woman, aged 24, single, suffering from subacute bacterial endocarditis, on oral examination showed normal appearing soft tissues. The upper left second molar and the lower right second molar were crowned. The upper right first, second and third molars, lower right second bicuspid and first and third molars were missing, and upper left cuspid and first and third molars and lower left second bicuspid and first and third molars were missing. The remaining teeth had fillings which appeared to be in good condition except for a large broken down distoclusal amalgam filling in the upper right first bicuspid, an upper left lateral root extending to the gum line, a deep mesial cavity on the upper right lateral incisor and a broken down lower right second molar. The two crowns were removed from the upper left and lower right second molars. Roentgenographically, there was no evidence of disease about any of the teeth.

TABLE 1.—PULP TEST FINDINGS, CASE 1

	R					L				
	(25)	(N)	(25)	(2)	(18)	(18)	(N)	(20)	(20)	(N)
Upper	5	4	3	2	1	1	2	4	5	7
Lower	7	4	3	2	1	1	2	3	4	7
	(2)	(20)	(25)	(23)	(25)	(25)	(23)	(25)	(20)	(30)

Wherever possible, the same tooth on the opposite side of the same jaw was pulp tested and its electrical response was considered an index for the tooth to be tested. If that tooth were not present, the nearest similar tooth was used as a guide. As is well known, in electrical pulp testing, patients react differently, so that each patient has his own electrical index, which may be used as a guide.

Table 1 gives a graphic representation of the findings in Case 1. The letter N stands for no electrical response. Such teeth are considered pulpless.

The upper right first bicuspid, upper left lateral incisor and upper left second molar showed no electrical response, this indicating a lack of vitality in these teeth. The upper right lateral incisor and lower right second molar responses indicated that there was a definite decline in vitality. The pulpless teeth were removed surgically October 18, 1943, at one session in the operating room, following the régime previously outlined. Postoperatively, the patient had no pain, no swelling, no bleeding and no rise in temperature, and felt generally comfortable. Blood cultures remained sterile. Cultures taken from the sockets showed *Streptococcus viridans*. Significantly, this patient had subacute bacterial endocarditis with *Streptococcus viridans* as the causative organism. Three weeks later, under the same preparatory procedure, the upper right lateral incisor and lower right second molar were removed as a prophylactic measure. Cultures again showed *Streptococcus viridans*. The postoperative reaction to the second procedure was similar to that of the first. The patient stated that she "felt better" after these pulpless teeth were removed. She subsequently was discharged from the hospital cured or with an arrested case of subacute bacterial endocarditis.

TABLE 2.—PULP TEST FINDINGS, CASE 2

	R							L					
Upper	(18) 7		(15) 3		(15) 2		(15) 1	(13) 1	(18) 2		(15) 3	(N) 5	(18) 7
Lower	8 (20)	7 (20)	6 (20)	5 (20)	3 (13)	2 (13)	1 (13)	1 (13)	2 (16)	3 (13)	4 (13)	7 (N)	8 (N)

TABLE 3.—PULP TEST FINDINGS, CASE 3

	R								L							
Upper	(35) 8	(35) 7	(35) 6	(N) 5	(28) 4	(30) 3	(20) 2	(20) 1	(20) 1	(20) 2	(25) 3	(30) 4	(N) 5	(35) 6	(35) 7	(35) 8
Lower	8 (35)	7 (35)	6 (35)	5 (28)	4 (28)	3 (30)	2 (20)	1 (20)	1 (20)	2 (20)	3 (25)	4 (30)	5 (30)	6 (35)	7 (35)	8 (35)

Case 2.—J. N., a man, aged 31, married, suffering from subacute bacterial endocarditis, had oral soft tissues that appeared normal. There was no unusual dental history. In the lower right side of the mouth was a one-tooth fixed bridge with a crown on the second bicuspid supplying the first bicuspid. This bridge was removed. The upper left second bicuspid had a large distoclusal cavity. The lower left second molar had a large discolored amalgam filling and a badly broken down third molar was present. Roentgenographic examination revealed thickening of the apical portion of the peridental membrane of the upper left second bicuspid, a small periapical area of the lower left second molar with inadequately filled root canals and a breaking down of the peridental membrane of the lower left third molar with a small periapical area. Table 2 represents the results of the electrical pulp test in this patient.

As can be observed, the upper right bicuspids and the first and third molars were missing, as well as the upper left first bicuspid and first and third molars. In addition, the patient had three devitalized teeth. The others were considered normal. Under the same régime as previously described, the three devitalized teeth were surgically removed. Postoperatively, the patient had no untoward effects subjective or objective. Cultures taken from the dental sockets yielded *Streptococcus viridans*, the organism causing the patient's illness. After dental surgical measures, the patient asserted that

he "felt better" generally. Subsequently, he was discharged apparently cured of his subacute bacterial endocarditis.

CASE 3.—C. M., a woman, aged 27, married, suffering from subacute bacterial endocarditis, on clinical examination showed normal soft tissues and a full complement of teeth in good condition. The history indicated no previous dental trouble except for two porcelain jackets on the upper right and left second bicuspids. Roentgenographic examination showed all teeth in good condition except the upper second bicuspids, right and left. These had faulty root-canal fillings with a break in the peridental membrane in the apical thirds. The electrical pulp test substantiated the clinical and x-ray findings. Table 3 is a record of the pulp tests.

Under the régime previously described, both upper second bicuspids were removed in the operating room and cultures were made. The bacteriologic report revealed *Streptococcus viridans*—the organism causing this patient's illness. There was no postoperative reaction and the blood cultures remained sterile. The patient stated that she "felt much better." Subsequently, she was discharged as apparently cured of subacute bacterial endocarditis.

CASE 4.—H. C., a woman, aged 52, single, suffering from subacute bacterial endocarditis, on oral examination showed normal soft tissues. From Table 4, it can be observed that the upper right second bicuspid and first and third molars were missing; all teeth were present in the upper left jaw, and the lower right third molar and the lower left first, second and third molars were missing. Roentgenographic examination revealed that the upper left central incisor had been devitalized and restored with a porcelain jacket, with an inadequate root-canal filling. There was a degenerated peridental membrane apically with a diffuse shadow in the periapical area. The right lateral incisor, which had also been devitalized, showed a faulty root-canal filling, a break in the continuity of the peridental membrane and a diffuse periapical area. The lower left second bicuspid had also been devitalized, with a proper distoclusal amalgam filling, an inadequate root-canal filling and a break in the peridental membrane, but no diseased condition in the periapical area. There was also a small remnant of the apical one-third of the distal root of the lower left first molar present. This showed no periapical pathosis. The lower right first molar showed a large "leaking" distoclusal amalgam filling with much decay under the filling, extending to the pulp, and a dark area periapically about the distal root. The results of the electrical pulp test are recorded in Table 4. After examination, it was decided to remove the upper left central incisor, lower left second bicuspid and lower left first molar root in a first-stage operation, and the upper right lateral incisor and lower right first molar in

TABLE 4.—PULP TEST FINDINGS, CASE 4

	R							L						
Upper	(25) 7		(22) 4		(20) 3	(N) 2	(18) 1	(N) 1	(20) 2	(20) 3	(22) 4	(22) 5	(25) 6	(25) 7	(25) 8
Lower	7 (25)	6 (N)	5 (22)	4 (22)	3 (20)	2 (20)	1 (18)	1 (20)	2 (20)	3 (20)	4 (22)	5 (N)	6 (R)		

TABLE 5.—PULP TEST FINDINGS, CASE 5

	R								L							
Upper	(25) 8	(25) 7	(N) 6	(25) 5	(25) 4	(20) 3	(20) 2	(20) 1	(20) 1	(20) 2	(20) 3	(25) 4	(25) 5	(20) 6	(35) 7	(35) 8
Lower	8 (30)	7 (30)	6 (30)	4 (25)	3 (20)	2 (20)	1 (20)		1 (20)	2 (20)	3 (20)	4 (25)	5 (30)	6 (30)	8 (30)	

a second-stage operation. October 10, 1943, with the usual régime, the first-stage operation was performed in the operating room. Postoperatively, the patient had no reactions, subjective or objective, and blood cultures remained sterile. The patient said she "felt good." The second stage operation was performed November 11, 1943, with the same postoperative results. November 17, 1943, the patient was discharged from the hospital as apparently cured or having an arrested case of subacute bacterial endocarditis.

CASE 5.—F. R., a woman, aged 43, married, suffering from subacute bacterial endocarditis, on oral examination showed a normal mucosa and soft tissues of the mouth with all teeth present except the lower right second bicuspid and the lower left second molar. The teeth presented a moderate number of fillings. Roentgenographic examination revealed moderate alveolar resorption throughout the mouth interproximally, a devitalized upper right first molar with adequate root-canal fillings, a break down of the peridental membrane about the three roots and a small dark circumscribed periapical shadow about the distobuccal root of that tooth. There was also evidence of decay under an inlay in the lower right first molar. This inlay was an abutment for a one-tooth precision bridge supplying the missing right second bicuspid. The upper right third molar was partially impacted and malposed. The rest of the mouth was roentgenographically negative. The electrical pulp test findings are given in Table 5.

February 12, 1944, the patient was taken to the operating room. With the usual preparation, the upper right first molar was removed in an open flap operation. Cultures were made. In this case, the upper right third molar was relieved of its impaction pressure. A triangular piece of bone was removed from between it and the second molar to allow freedom for normal descent, which occurred shortly thereafter. Postoperatively, there was no rise in temperature, swelling, pain or bleeding. Blood cultures remained sterile. *Streptococcus viridans,* the organism causing this patient's illness, was recovered from the tooth socket here. The patient said she "felt better and had more pep." Two weeks after operation, she was discharged from the hospital, apparently cured of subacute bacterial endocarditis.

CASE 6.—S. S., a woman, aged 26, married, suffering from subacute bacterial endocarditis, had been under the regular care of a dentist and wore a large partial upper horseshoe-shaped acrylic bridge and a lower lingual bar acrylic bridge. The soft tissues appeared normal and the bridges were comfortable. The upper left second molar was crowned and the lower left second bicuspid had a very large distoclusal "leaking" amalgam filling in it. The tooth was slightly discolored. The molar crown was removed prior to x-ray examination and pulp testing. In the roentgenograms, all teeth appeared

TABLE 6.—PULP TEST FINDINGS, CASE 6

	R					L			
Upper	(25) 7	(25) 4	(20) 2	(12) 1		(20) 3	(20) 7		
Lower	8 (25)	4 (20)	3 (20)	2 (20)	1 (15)	1 (15)	3 (20)	4 (20)	5 (3)

TABLE 7.—PULP TEST FINDINGS, CASE 7

	R								L							
Upper	(N) 8	(35) 7	(35) 6	(30) 5	(30) 4	(20) 3	(N) 2	(N) 1	(N) 1	(N) 2	(30) 3	(30) 4	(30) 5	(35) 6	(35) 7	(35) 8
Lower	8 (35)	7 (35)	6 (35)	5 (N)	4 (30)	3 (20)	2 (15)	1 (15)	1 (5)	2 (15)	3 (25)	4 (25)	5 (30)	6 (35)	7 (35)	8 (35)

normal except for marked thickening, periapically, of the lower left second bicuspid. The electrical pulp test findings are given in Table 6.

It was decided to remove the lower left second bicuspid because of its low electrical index, and, following the usual procedure, the patient was taken to the operating room, March 5, 1944. The tooth was removed and cultures made. Postoperatively, there was the same uneventful recovery as in the previous cases. *Streptococcus viridans* was recovered from the tooth socket. Blood cultures remained sterile. A week after this procedure, the patient had her tonsils removed. One week later, she was discharged from the hospital, apparently cured of subacute bacterial endocarditis.

CASE 7.—R. H., a man, aged 48, married, suffering from subacute bacterial endocarditis, on oral examination showed a full complement of thirty-two teeth. Most of them, including the upper and lower anterior teeth, were in bad condition, with very large compound amalgam fillings. Most of the teeth were bluish black, but the patient had no oral complaints. The mucosa was in good condition. Moderate alveolar resorption was present. Roentgenologic examination revealed devitalized upper right and left central incisors and upper right and left lateral incisors with fair root-canal fillings. No periapical areas were present. The lower right second bicuspid was also devitalized and an inadequate root canal filling was present, although no periapical area was seen. The upper right third molar was pulpless. There was a wholly inadequate root-canal filling and a faulty compound amalgam filling. The electrical pulp test findings are given in Table 7.

After all tests had been made, it was decided to remove the six pulpless teeth in a one-stage operation. March 5, 1944, the patient was taken to the operating room and the six teeth were removed under the described régime. Recovery was uneventful. Blood cultures remained sterile. Cultures of the teeth revealed *Streptococcus viridans,* the organism causing the patient's illness. A temporary removable upper anterior bridge was made for the patient while in the hospital and, March 18, he was discharged, apparently cured of subacute bacterial endocarditis.

TABLE 8.—DENTAL DATA ON CASES REPORTED

Condition Present	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Total Number Teeth
Devitalized teeth	3	2	2	4	1		6	18
Devitalized root remnants	None	1		1				2
Previous root therapy	None	1	2	4	1		5	13
No previous root therapy	3	2		1			1	7
Roentgenographic evidence of infection		3		1	1			5
No roentgenographic evidence of infection	3		2	3			6	14
Low electrical index to pulp tester	2					1		3

SUMMARY

1. Seven cases of subacute bacterial endocarditis presented the typical clinical pictures of the disease. In all of these cases, roentgenographic evidence of dental pathosis or pulpless teeth or root remnants was found. The gums and oral mucosa appeared normal. Electrical pulp tests revealed an apparent abnormal status of vitality of any teeth when present. Table 8 indicates the number, condition and previous treatment of teeth removed.

2. In the cases in which disease was found, it was surgically eradicated.

3. In all cases, *Streptococcus viridans* was grown from cultures.

4. All patients endured the operations and manipulation without any untoward or ill effects and, in all cases, prompt and perfect healing resulted.

5. All patients were discharged with clean mouths, and with no evidence of potential oral infection, apparently cured of their disease, and have been without recurrence to date.

6. Because of unavoidable circumstances, no controls were included in this series. It is planned to place under observation, after discharge from the hospital, a series of patients who will be subjected to diagnostic study for oral pathosis, pulpless teeth with or without previous root therapy, root remnants and suspected teeth as indicated by electrical pulp testing, and upon whom no oral surgical procedures or other oral prophylaxis will be carried out. This series will be kept under careful observation for symptoms of recurrence and will be made a subject of future report.

7. The number of cases is too small and the time elapsed is too short to make any final statement concerning the permanency of the result. More time is needed and more cases must be studied.

CONCLUSIONS

1. Seven cases of subacute bacterial endocarditis due to *Streptococcus viridans* infection were dentally examined and found to harbor devitalized teeth with or without periapical disease, and with or without previous root-canal therapy. Some also showed root fragments.

2. All devitalized teeth with previous adequate root-canal therapy were removed and found to be infected. *Streptococcus viridans* was regularly recovered in cultures.

3. All devitalized teeth, regardless of roentgenographic evidence of pathosis and with or without previous adequate root therapy, were found to be infected and culture revealed *Streptococcus viridans.*

4. All patients had absolutely no postoperative complications and no untoward results, with prompt healing of all wounds.

5. All blood cultures remained sterile.

6. All patients asserted that they experienced a definite improvement from one to three days after oral surgical procedures.

7. Patients tolerate the topical application of from 5,000 to 10,000 Oxford units of penicillin in dental sockets. They also tolerate the same amounts in gauze dressings. No local or systemic disturbances followed in any case.

8. There appears to be no contraindication for the use of penicillin in strength both topically and on dressings in all phases of dental surgery.

9. Dental x-ray full-mouth examination, extractions and dental surgical operations were performed on these patients with no apparent deleterious effects. This procedure is a radical departure from previous medical practice in this formerly fatal disease and should be significant in its future management and control.

BIBLIOGRAPHY

1. LIBMAN, E., and FRIEDBERG, C. K.: Subacute Bacterial Endocarditis. New York: Oxford University Press, 1941.

2. BERNSTEIN, M.: Subacute Bacterial Endocarditis Following Extraction of Teeth. *Ann. Int. Med.*, 5:1138, March 1932. RUSHTON, M. A.: Subacute Endocarditis Following Extraction of Teeth. *Guy's Hosp. Rep.*, 80:39, January 1930.

3. FELDMAN, L., and TRACE, I. M.: Subacute Bacterial Endocarditis Following Removal of Teeth or Tonsils. *Ann. Int. Med.*, 11:2124, June 1938.

4. OKELL, C. C., and ELLIOTT, S. D.: Bacteremia and Oral Sepsis with Special Reference to Etiology of Subacute Endocarditis. *Lancet*, 2:869, October 19, 1935.

5. LOEWE, LEO; ROSENBLATT, PHILIP, and LEDERER, M.: Experimental Thrombotic (Streptococcus Viridans) Endocarditis. *Am. J. Path.*, 20:89, January 1944.

6. KELSON, S. R.: New Method of Treatment of Subacute Bacterial Endocarditis. *J.A.M.A.*, 113:1700, November 4, 1939. MCLEAN, J.; MEYER, B. B. M., and GRIFFITH, J. M.: Heparin in Subacute Bacterial Endo-

carditis. *J.A.M.A.*, 117:1870, November 29, 1941.

7. KEEFER, C. S., *et al.*: Penicillin in Treatment of Infections. *J.A.M.A.*, 122:1217, August 28, 1943.

8. LOEWE, LEO, *et al.*: Combined Penicillin and Heparin Therapy of Subacute Bacterial Endocarditis. *J.A.M.A.*, 124:144, January 15, 1944.

9. DAWSON, M. H., and HOBBY, GLADYS L.: Clinical Use of Penicillin. *J.A.M.A.*, 124:611, March 4, 1944.

10. DUBOS, R. J.: Antimicrobial Agents of Biologic Origin. *J.A.M.A.*, 124:633, March 4, 1944.

11. ULRICH, J. L.: Blind Dental Abscess. *J.A.M.A.*, 65:1619, 1916.

12. HARTZELL, T. B., and HENRICI, A. T.: Study of Streptococci from Pyorrhea Alveolaris and from Apical Abscesses. *J.A.M.A.*, 64:1055, 1915.

13. FRASER, C. J.: Preliminary Report on Relation of Streptococcus Viridans to Periapical Infection. *Brit. D. J.*, 44:1350, December 1, 1923.

14. APPLETON, J. L. T.: Bacterial Infection, with Special Reference to Dental Practice. Ed 2. Philadelphia: Lea & Febiger, 1933.

15. ROSENOW, E. C.: Oral Sepsis in Relation to Focal Infection. *J.A.D.A.*, 14:1417, August 1927.

COMPARATIVE STUDY OF DARK-FIELD AND STAINED SMEAR TECHNICS FOR IDENTIFICATION OF ORAL SPIROCHETES ON THE BASIS OF MORPHOLOGIC CHARACTERISTICS

EDWARD G. HAMPP,* D.D.S., M.S., Bethesda, Md.

INTRODUCTION

OUR knowledge of bacterial morphology has been gained for the most part by systematic microscopic observation of pure cultures of organisms maintained in the laboratory on artificial culture media. In this respect, the stained smear and the hanging-drop preparation have been used to advantage in studies of most bacterial species; but such preparations are of relatively little value in morphologic studies of spirochetes. The dark-field microscope has been of great value in such work, representing the only simple method by which the details of spirochetal morphology may be elucidated. In spite of knowledge of this technic, there persist a considerable number of workers who attempt to identify spirochetes by observation of fixed and stained smears. It is the purpose of this paper to compare the findings observed when pure cultures of spirochetes are studied microscopically, using fixed and stained smears observed with direct illumination and wet preparations observed with dark-field illumination, and to point out the fallacy of employing the former method as a means of establishing the identity of the oral spirochetal species.

The fine structural differences that exist among the various members of the group, which are the only means available for the differentiation of the various species, may be so distorted or obscured when fixed and stained smears are used that identification of the spiral forms is difficult. This is especially true of the smaller oral treponemes whose

*Fellow, Research Commission, American Dental Association; Passed Assistant Dental Surgeon (R), National Institute of Health, United States Public Health Service.

structure may be so altered in many instances that they may be confused with the intermediate forms of the larger spirochetes of the mouth.

MATERIAL AND METHODS

The source of the material in this study was subgingival scrapings from human cases of gingivitis and Vincent's stomatitis, and also from numerous pure cultures of the smaller treponemes isolated from oral infections. Pure cultures, when used as a source of material, were examined within twenty-four hours after growth was initiated. The sample organisms were in all cases selected from the periphery of the advancing edge of growth so that young actively growing organisms would be obtained, since they are generally considered typical of the species. Whether the material containing spirochetes was obtained directly from lesions in the mouth or from cultures, the sample was suspended in sterile physiologic sodium chloride solution. Small amounts of this bacterial suspension were then used to make heat-fixed stained smears and, at the same time, wet preparations were made from the same sample. These served as controls for direct examination of the living organisms under the dark-field microscope.

The stain used for the dried films was crystal violet: 1 part of a saturated solution of the dye in 95 per cent alcohol and 9 parts of distilled water.

Since much has been written concerning measurements of the oral spirochetes,[1, 2, 3, 4, 5, 6, 11] no attempt will be made to repeat this work, but such morphologic variations as are made apparent by the two methods will be discussed.

RESULTS AND COMMENT

Thirty-five pure cultures of the smaller oral treponemes obtained from human cases of oral infection were studied in detail. Numerous heat-fixed stained smears prepared from these cultures exhibited organisms with from a moderate to an extreme degree of distortion, which primarily affected the shape, size and spacing of the coils. In many instances, the structure of these organisms was so altered that they could have easily been confused with certain of the intermediate forms of the larger oral spirochetes.

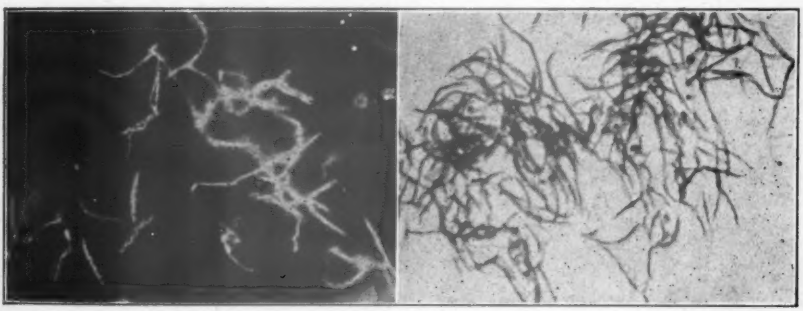


Fig. 1.—Dark-field and stained smear preparations obtained from pure culture of smaller oral treponemes; fourth passage. (×1455.)

The probable explanation for such cellular changes may be based on several facts. The act of drying a smeared preparation in air will cause plasmolysis of the spirochetal body.[3] The extreme length of the oral treponemes in comparison with their width tends to cause the organisms to unfold their closely knit, symmetrically placed coils and assume a straight position when dried in

air. This tendency is further accentuated by heating during fixation. The smaller treponemes have been found to be more stain-resistant than other oral spirochetes. This necessitates prolonged staining and, in certain instances, may require steaming of the dye at some time during the procedure to obtain a suitable preparation. This further contributes to the alteration of their structure. The end-result is wavy distorted filaments modification of the structure of which may vary from a slight to an excessive degree on comparison with the same organisms observed in the living state by dark-field examination. Although this altered structure is not fully evident in all the cells, it usually predominates in the greater percentage of individuals represented in such smears. The tapering, pointed extremities and the fine terminal filaments are not apparent in such preparations.

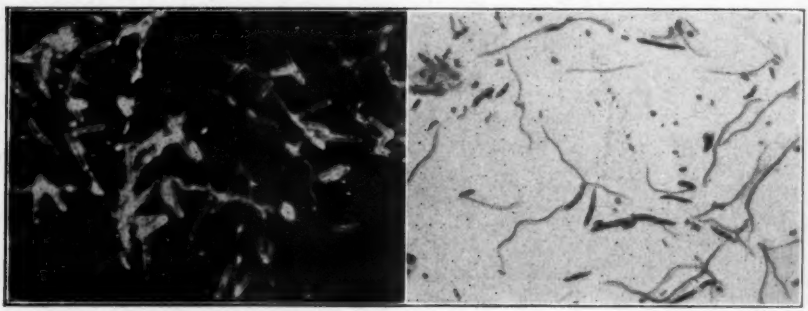


Fig. 2.—Dark-field and stained smear preparations of Borrelia buccale and other oral organisms obtained from case of marginal gingivitis. (×1455.)

The conditions described can be better appreciated when a dark-field examination and a stained smear are made from the same sample of organisms. Figure 1 shows two such preparations made from a pure actively growing culture of one of the smaller treponemes. The dark-field photomicrograph shows quite clearly the closely knit arrangement of the fine symmetrically placed coils as well as the fine tapering extremities. Several organisms are represented in which no coils are in evidence. Such forms, which are usually found in chains of various lengths, constitute an extremely small percentage of the total number of organisms in a given specimen. The stained smear made from the same bacterial suspension (Fig. 1, right) exhibits spirochetes with a marked degree of distortion. The morphologic changes are most evident as regards the shape, size and spirals. The tendency of the treponemes to uncoil their spirals in these dried film preparations and assume a straight form is vividly portrayed. There are present many organisms that vary from almost straight forms to long wavy filaments exceeding in length the spirochetes in the control dark-field photomicrograph. This change in length is apparently due to the unfolding of coils. Certain of these forms could be easily confused with the smaller types of the oral *Borrelia*. Neither the tapered, pointed ends nor the terminal filaments are in evidence.

The phenomenon of altered structure of the small treponemes in stained smears is not restricted to this group of organisms, but can also be demonstrated in the larger oral spirochetes. *Borrelia buccale* and what is considered to be *Borrelia vincenti*, the two largest spirochetal inhabitants of the oral cavity, can

be recognized in the dark-field with a rather uniform degree of accuracy. The coils of both organisms are larger, more open and extremely flexible as compared with the small, closely knit, symmetrically spaced spirals of the oral treponemes.

Figures 2, left, and 4, left, represent dark-field photomicrographs of *Borrelia buccale* and *Borrelia vincenti*. The former organism was obtained from a case of marginal gingivitis and the latter from a tonsillar lesion in a case of Vincent's angina. It is evident that *B. buccale* is longer and wider, and the coils are proportionally larger and more widely spaced than those of *B. vincenti*. In addition, *B. buccale* is doubly contoured, apparently owing to the extreme

Fig. 3.—Dark-field preparation of Borrelia buccale from mixed spirochetal culture; third passage. The inoculum for this culture was obtained from the same source as that shown in Figure 2, left. (×1455.)

width of the cell body, which reflects light off the opposite surface and is resolved separately.[11] *B. vincenti* does not exhibit this double contoured appearance, an important point in differentiating between the two forms. In contrast, the width of *B. vincenti* is from one-half to two-thirds that of *B. buccale*, so that the former appears as a long, thin, graceful spirochete. The extremities of *B. buccale*, as a rule, present abruptly tapered, pointed ends; whereas *B. vincenti* has both extremities more delicately tapered and pointed. Terminal filaments are occasionally observed in both species.

Under lower magnification (×645), the cell bodies of both *B. buccale* and *B. vincenti* reflect light in a characteristic manner, apparent as a yellowish tinge, while the smaller oral treponemes present a brilliant white hue. This difference, although present, is not so pronounced under higher magnification (×1455).

Figures 2, right, and 4, right, are photomicrographs of heat-fixed stained smears of *B. buccale* and *B. vincenti*. These preparations were made from the same bacterial suspensions as Figures 2, left, and 4, left. Here, as in the case of the smaller oral treponemes, it is apparent that the greatest amount of physical distortion is found in relation to the shape, size and spacing of the coils. The extreme length and the wide coils characteristic of these species increase their tendency to assume a straight line when dried in air and fixed by heat. As seen, both photographs show spirochetes varying from almost straight forms to thin, wavy, ribbonlike filaments possessing several widely spaced irregular shallow spirals, and which are very unnatural when compared with their mates shown in the control dark-field photomicrographs. The shrinking and narrowing of the cell bodies are most apparent in *B. buccale*. The extremities of both organisms may exhibit the tapered, pointed ends, or they may be blunted, the shape depending on whether the smear preparations were properly made. The terminal protoplasmic filaments have never been observed in such preparations.

In many cases of oral infection, *B. buccale* is found to be the predominating spirochetal type by dark-field examination. When stained smears from such cases are prepared, the organisms in question may be confused with *B. vincenti*, particularly if a dark-field exam-

ination is not made. This becomes evident when it is considered that the two organisms undergo distortion in a similar manner, the shrinkage being more severe in the case of *B. buccale*. Therefore, a stained smear is misleading and cannot be used to establish the identity of either organism.

It is customary to find morphologic descriptions in the literature[6, 7, 9, 10] depicting *B. vincenti* as a delicate, loosely wound spirochete with irregular coils. Unfortunately, there is no indication as to whether such observations were made by dark-field or by stained smear examination. The irregularity of the coils is often explained on the assumption that the spirals are not fixed and the organism is extremely flexible. due to a fixation-staining phenomenon, as previously described.

Of the larger oral spirochetes, *B. buccale* has been reported isolated in pure culture on few occasions by technics difficult to reproduce.[6, 7, 8] In our experiments, this organism has been obtained in large numbers on numerous occasions in conjunction with the smaller treponemes and free from contaminating oral bacteria. Figure 3 represents a dark-field photomicrograph of *B. buccale* in a mixed spirochetal culture. The inoculum for this culture was obtained from the same source as the organisms portrayed in Figure 2, left. It is apparent that the organisms from the culture are shorter and narrower than those found in the original gingival scrapings

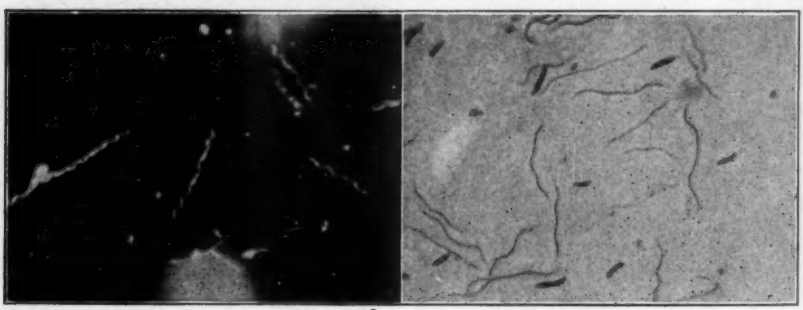


Fig. 4.—Dark-field and stained smear preparations of spirochetal forms that conform with morphologic descriptions of Borrelia vincenti. In the stained smear, the three forms almost parallel and in the center of the field are the organisms in question. The remaining spiral forms are Borrelia buccale. The material was obtained from a tonsillar lesion in a case of Vincent's angina. (×1455.)

However, dark-field observation of the Vincent-type spirochete (Fig. 4, left) shows that the coils are not irregular, but are constructed uniformly and widely spaced. When in motion, the organism exhibits rapid flexion, looping, translation and rotation. There is an apparent tendency to extension of its spirals during motion, with reconstitution of the spirals when it slows down or movement ceases. It is only in stained smears that modified morphologic types are observed and, in all probability, the changes are and, in addition, the spirals are proportionately smaller and more compact. In both preparations, the spirochetes present double contoured forms with pointed ends. In the living state, they exhibited rapid flexion, looping, translation and rotation. It is often stated in the literature[3, 6, 9, 12] that the movements of this organism are serpentine. This type of motility was not apparent either in the organisms obtained directly from the mouth or in those obtained from mixed spirochetal cultures. When

wet dark-field preparations began to dry so that the movements of the spirochetes were restricted, and only then, were the serpentine movements observed, and we do not consider these movements characteristic of the species.

Conclusive evidence has never been presented that *B. vincenti* has been obtained in pure culture. Klein[9] asserts that he has obtained it. However, the only evidence submitted in support of his assumption consists of a single dark-field photograph of three spirochetal forms of which the morphologic details are obscure. No attempt was made to present a morphologic description of his organisms in the text or with the illustration.

pointed ends. (Compare Figure 4, left.) In the living state, it is extremely motile, exhibiting rotation, looping, flexion and translation, and coincides with descriptions of *Borrelia vincenti* presented in the literature.[5, 6, 10, 12] Figure 5, right, represents a stained smear made from the same suspension of organisms as Figure 5, left. Here, as in the case of the other oral spirochetes previously described, the distortion is most evident as regards the coils. These organisms vary from almost straight forms to wavy filaments possessing widely spaced irregular spirals. Many of the extremities are delicately pointed. Others are rounded and blunted. Numerous intermediate forms are in evidence.

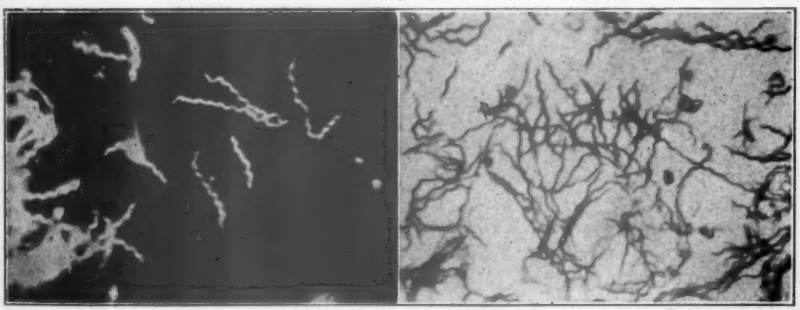


Fig. 5.—Dark-field and stained smear preparations of pure culture, third passage, of large oral spirochetal forms which conform with descriptions in literature for Borrelia vincenti.

During a series of cultural experiments in this laboratory, a large oral spirochete was obtained on several occasions in primary cultures together with the smaller treponemes and *B. buccale*. Figure 5, left, is a photomicrograph of a dark-field preparation of one strain of this large spirochete isolated in pure culture. It is morphologically different from our pure strains of smaller treponemes and the mixed spirochetal culture of *B. buccale*. The dark-field illustration shows clearly that it is a large organism possessing large, widely spaced symmetrically placed spirals. It is not double contoured and has delicately

SUMMARY

Differences in structures of certain of the oral spirochetes were observed when they were examined in the living state by dark-field illumination and in air-dried, heat-fixed stained smears by direct illumination. The organisms used were from pure cultures of the smaller oral treponemes, a large spirochetal form morphologically similar to those described in the literature as *Borrelia vincenti* and mixed spirochetal cultures containing *Borrelia buccale*. These pure strains were supplemented by organisms obtained from subgingival scrapings in cases of oral infection.

Our observations show that use of air-dried, heat-fixed stained smears of spirochetal forms is extremely unreliable, failing to indicate fine structural differences between spirochetal species, and thus giving a false impression of the organisms in question. Such preparation causes extreme distortion of the smaller oral treponemes and shrinkage and distortion of the oral *Borrelia*. These changes are sufficient to make it impossible to recognize the organism referred to as *B. vincenti*, as it may be confused with *B. buccale*, or *B. buccale* may be mistaken for the pathogenic species. Such observations are equally applicable to the smaller oral treponemes the altered morphologic forms of which may be confused with certain of the intermediate forms of the oral *Borrelia*. These oral spirochetes, when observed in the living state by dark-field illumination, present sufficient differences to be distinguished and identified.

It cannot be overemphasized that as an aid in the diagnosis of oral infection due to the presence of spirochetes, the laboratory method of choice is observation of living organisms by dark-field examination. Until this fact is recognized, confusion will continue to exist in the identification of the oral spirochetal types associated with such conditions.

BIBLIOGRAPHY

1. Noguchi, Hideyo: Cultural Studies on Mouth Spirochaetae (Treponema Microdentium and Macrodentium). *J. Exper. Med.*, 15:81, January 1912.

2. *Idem:* Treponema Mucosum (New Species), a Mucin Producing Spirochaeta from Pyorrhea Alveolaris, Grown in Pure Culture. *J. Exper. Med.*, 16:194, August 1912.

3. Dobell, C.: Researches on Spirochaetes and Related Organisms. *Arch. f. Protistenkunde*, 26:119, July 1912.

4. Mühlens, P.: Vergleichende Spirochätenstudien. *Ztschr. f. Hyg.*, 57:405-416, 1907.

5. *Idem.:* Andere, Sum Teil Als Pathogen Geltende Spirochäten. *Kolle u. Wasserman's Handb. path. Mikroorg.*, 7:921-950, 1913.

6. Smith, D. T.: Oral Spirochetes and Related Organisms in Fuso-Spirochetal Diseases. Baltimore: Williams and Wilkins Co., 1932.

7. Proske, H. D., and Sayers, R. R.: Pulmonary Infection and Pneumoconiosis. I. Bacteriologic and Experimental Study. *Pub. Health Rep.*, 49:839, July 20, 1934.

8. Gins, H. A.: Untersuchungen über die Spirillen der Menschlichen Mundhöhle. *Ztschr. f. Hyg.*, 124:460-479, 1942. Abstr. *Gesellsch Hyg.*, 51:211, 1943.

9. Klein, H. S.: Oral Spirochetes, Their Occurrence in Diseases of Oral Cavity and a Simple Method of Pure Cultivation. *Acta Odontol. Scandinav.*, 5:1-18, October 1943.

10. Thomson, J. G., and Thomson, D.: Some Researches on Spirochetes Occurring in Alimentary Tract of Man and Some of Lower Animals. *Proc. Roy. Soc. Med.*, 7:47, July 1913-1914.

11. Rosebury, Theodor: Photomicrographs of Some of Parasitic and Pathogenic Spirochetes and Spirilla as They Appear Under Dark-Field Microscope. *J. Lab. & Clin. Med.*, 27:1470, August 1942.

12. Semple, D.; Price-Jones, C., and Digby, L.: Report for Pathological Committee of War Office of Inquiry into Gingivitis and Vincent's Disease Occurring in Army. *J. Roy. Army M. Corps.*, 33:281, October 1919.

CLINICAL OBSERVATIONS ON AMALGAM WITH KNOWN PHYSICAL PROPERTIES
FINAL REPORT*

RALPH W. PHILLIPS, B.S.; DREXELL A. BOYD, D.D.S.; HARRY J. HEALEY, D.D.S., and WILLIAM H. CRAWFORD, D.D.S., Indianapolis, Ind.

IT may be said that conclusions regarding the behavior of amalgam in the mouth that are based upon laboratory findings are acceptable only after being verified by clinical evidence. Too often, investigators are prone to accept the results of laboratory experiments as criteria in evaluation of materials, without determining whether clinical observations substantiate the laboratory findings. Industrial manufacturers set up their standards only after many hours of testing with the material in actual service. Likewise, we can establish accurately our standards for amalgam only after correlating experimentation with clinical research.

A vast amount of laboratory experimentation has concerned the change in physical properties of amalgam with various methods of manipulation. A wide variation in physical properties may be obtained by slight variations in the manipulation. From a study of these properties, as determined by laboratory tests, certain conclusions have been reached as to what may be anticipated in the mouth in employing various technics. Thus, we have so governed our manipulation of amalgam as to make it conform as nearly as possible in physical properties to those established as the standard by laboratory test. However, little actual clinical research has been carried out to determine whether variations in the physical properties from the accepted standards will produce clinically inferior restorations. Technics employed in mixing amalgams that do not yield expansion or flow properties falling within our theoretical standards are condemned, although these technics may be superior in working qualities and crushing strength.

The effect of various methods of trituration upon the physical properties of amalgam has been well established. Undertriturated amalgam, regardless of the brand of alloy, expands from 10 to 20 microns beyond the upper limit of the A.D.A. specification of from 3 to 13 microns. They also exhibit a marked increase in flow over the 4 per cent and have a low crushing strength. Naturally, most alloys, when mixed according to the manufacturer's directions, will conform to the specifications. If the mix is continued longer than as directed by the manufacturer, the amalgam will usually contract and the rate of flow will be slightly higher than when it is mixed by manufacturer's directions, but the strength will be greater. (This long trituration will hereafter be referred to as the three-minute mix.) Only by adhering strictly to the manufacturer's directions can one be assured of an amalgam that will conform to the specifications, and any, often small, variance in this technic will produce an amalgam that will not expand between 3 to 13 microns after twenty-four hours and the flow value will be above 4 per cent. Owing to the results of these laboratory

*From the Indiana University School of Dentistry.

experiments, we have advocated strict adherence to the manufacturer's directions, since it was believed that the deviations in physical properties from our set standards in both the short and the long trituration would produce clinically inferior restorations.

The purpose of this investigation was to answer the following questions:

1. Would the dimensional change caused by the expansion of the under mix or the actual contraction of the three-minute mix be great enough to be observed in the mouth?

2. Would the high percentage of flow in the underamalgamated technic produce evidence of distortion in the filling?

3. Would there be any difference in surface roughness or tarnish for the three trituration technics?

4. Would the mix that adhered strictly to the manufacturer's directions actually prove superior under mouth conditions?

PROCEDURE

Long before any work was done in the mouth, we spent many hours in the laboratory, perfecting and standardizing our technics under the three methods of manipulation. These technics for mixing and packing, the only variable of which was trituration time, were so standardized that the same physical properties could be predicted with only a slight experimental error. These technics, as nearly identical as humanly possible, were then employed in placing the fillings in the mouth. It was anticipated that this procedure would produce fillings with the same properties as were obtained in the laboratory experiments.

In the spring of 1942, 130 fillings were placed in sixteen adult patients and fifteen children, 5-7 years of age. The children, who were from a welfare group, were especially suitable for this investigation since their mouth hygiene was poor. Small discrepancies in the fillings here would develop more readily into flagrant flaws than in mouths showing good care.

Thirty-six of the fillings were underamalgamated when mixed and, according to our laboratory tests, should have expanded from 20 to 30 microns. These fillings also had a flow value of 6 to 6.5 per cent, 100 per cent over those mixed by the manufacturer's directions and well over the specification limit of 4 per cent. Fifty-one were mixed by the manufacturer's directions, having an expansion of 7-9 microns. Thirty-four were triturated for three minutes and thus contracted 2-4 microns. In order to detect any dimensional change that might occur during the first twenty-four hours and to observe tarnish and discoloration as influenced by surface roughness, none of the fillings were polished, but were left as carved.

Special precautions were taken to avoid contamination of fillings during packing, and no hand mulling was used. Moisture contamination would, of course, cause a delayed expansion of several hundred microns,[1] which would obliterate the lesser dimensional change, due merely to the setting reaction.

All fillings were examined every six months by two investigators, each unaware of the other's observations and of the technic employed at the time of mixing. On occasion, as a further check, members of the clinical staff not participating in this project were asked to make examinations. These observations naturally involve human judgment, but that unfortunately is the only method of evaluating such clinical data. It was believed that by having several men making observations, the human element of variability might be somewhat reduced. Data on each chart, such as occlusion, packing time, remarks on preparation and finished restoration were taken into account in tabulating the results. The

1. Schoonover, I. C.; Souder, William, and Beall, J. R.: Excessive Expansion of Dental Amalgam. J.A.D.A., 29:1825-1832, October 1, 1942.

cavity preparations were made with extreme care and special precautions were taken against frail enamel walls. Examinations with the aid of a mouth mirror and sharp explorer were supplemented by x-ray examinations. At the end of the first six-month period, a preliminary report was published.[2] The present report deals with the final observations and conclusions after two years. Of the original 130 fillings, eighty-one were still available for the final two-year examination, thirty-three of which had been mixed by the manufacturer's directions, twenty-five underamalgamated and twenty-three subjected to the three-minute mix.

DIMENSIONAL CHANGE

The observations made in examining these fillings for dimensional changes have led us to conclude that the setting expansion of the underamalgamated mix or the contraction of the three-minute mix was not of sufficient magnitude, in either case, to be detected clinically. Very rarely, during these observations, could any investigator say, without hesitancy, that he definitely detected expansion or contraction. Of the eighty-one fillings, fifty-one were reported as showing no dimensional change. It is true that one of the investigators might have reported an *apparent* slight expansion or contraction of thirty of the fillings, but this apparent dimensional change was so slight that it could not be detected except under the most critical of examinations. It was indicated merely by a slight catch of the explorer as it passed over the margin. Although the fillings were examined critically after carving to check any overhang of amalgam, such discrepancies could have passed unnoticed and thus have been present at the time of insertion. Moreover, there are three definite reasons that any apparent expansion or contraction cannot be accepted as indicative of a dimensional change.

1. No one observer was consistent in his own observations over the two-year period. For example, one investigator at the end of the two-year examinations had completely reversed his opinions as reported at the one-year examinations. Eight fillings that he thought had an apparent expansion at one year were reported as apparently contracted at two years. Likewise, eleven fillings observed as contracted at one year were declared apparently expanding at the two-year period. It may be possible, in some cases, to assume that an apparent contraction at one year might be interpreted as an expansion at a later date owing to a breakdown of the enamel walls, but there is no possible explanation for a change in opinion from expansion to contraction over a period of time other than the fact that it is humanly impossible to detect accurately so small a dimensional change. It is probable that statements as to these apparent dimensional changes can be interpreted as merely indicative of an attempt by the investigators, when making observations as to expansion or contraction, to detect dimensional changes that were not there. Other members of the faculty, not aware of the nature of this problem, when called upon to determine whether they detected changes or differences in the fillings, never mentioned an apparent dimensional change.

2. Likewise, as there was no agreement among separate observations of the same investigator, neither was there any coherent correlation of the observations made by different men checking the same restoration. On many occasions, what was apparently expansion to one man would be interpreted as contraction by the next investigator.

3. Even if one were to accept these doubtful observations on dimensional

2. Phillips, R. W., et al.: Clinical Observations on Amalgam with Known Physical Properties. J. D. Res., 22:167-172, June 1943.

change, there is no tendency at all for the underamalgamated filling to show expansion or the three-minute mix to show contraction. In fact, four of the underamalgamated fillings showed conditions interpreted as contraction, and seven of the three-minute mix, apparent expansion. This is, of course, contradictory to what would have been expected and indicates the difficulty in detecting dimensional change of a slight degree.

No difference in appearance of the teeth around any filling was detected and likewise no evidence of recurrent caries, which might have been expected from the contraction of the three-minute mix. Apparently, such a slight contraction cannot be observed clinically, and there is no clinical evidence of danger of recurrent caries.

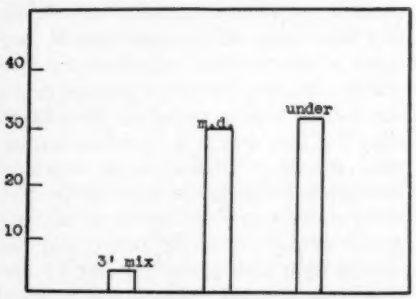


Fig. 1.—Percentage of fillings for each type that showed more than average roughness.

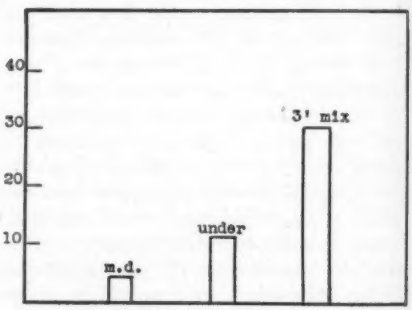


Fig. 2.—Percentage of each type showing less than average roughness.

The investigators wilfully contaminated only two fillings and, as reported in the preliminary paper, both fillings showed definite expansion and blisters. The marked expansion of amalgam in these two fillings, which was due to contamination, is from 200 to 300 microns, not the 10 or 20 micron variation as caused by setting reactions.

FLOW

There was no evidence of flow in any of the fillings, although eighteen evidenced trauma so extreme that the surface had been polished on the traumatic area. Four of the eighteen fillings showing this trauma had been underamalgamated and had a 6.5 per cent flow as tested in the laboratory, 2.5 per cent greater than permitted by the specifications. This seems to corroborate the statements by Sweeney[3] and Skinner[4] that flow is not often evidenced in the mouth when cavity preparation is properly carried out with the bulk of amalgam where needed. Our laboratory method of measuring flow is a static one and not closely comparable to actual mouth conditions. Hence, as shown by these observations, flow, when within reasonable limits and when supported by proper cavity preparation, will not be observed clinically.

ROUGHNESS AND TARNISH

In making observations for roughness and tarnish, differences in the type of mixing became evident. Considering roughness of the carved surface first, it would be surmised that those fillings which were underamalgamated might show the

3. Sweeney, J. T.: Amalgam Manipulation: Manual Vs. Mechanical Aids. J.A.D.A., 27:1940-1949, December 1940.

4. Skinner, E. W.: Research on Flow of Dental Amalgam. J.A.D.A., 25:1651-1660, October 1938.

roughest surface owing to the large grain size remaining after trituration. During carving, these grains would easily pull out, leaving a pitted surface. Likewise, it was felt that trituration for three minutes would so reduce grain size and facilitate carving that the roughness would be less than average. (By average, we mean the midpoint between the extremes.)

It was found that thirteen fillings had definitely less than average roughness and, of that number, eight had been triturated for three minutes. Figures 1 and 2 show graphically this tendency of longer trituration to reduce surface roughness.

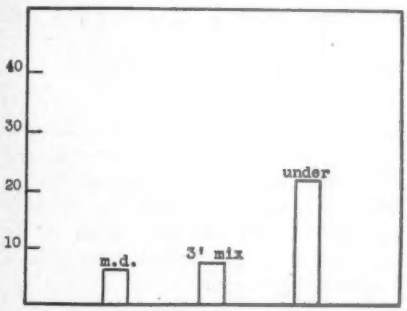


Fig. 3.—Percentage of each type showing more than average tarnish.

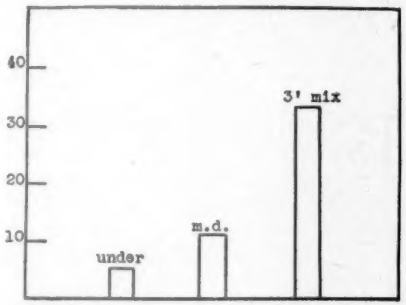


Fig. 4.—Percentage of each type showing less than average tarnish.

Figure 1 shows the percentage of fillings for each type of trituration that had more than average roughness. As seen here, only a very small percentage, 4, of the total number of fillings mixed for three minutes developed more than average roughness. Also, as seen from this graph, and contrary to what was expected, there was no tendency for the underamalgamated to be rougher than those mixed by the manufacturer's directions. The same percentage showed excess roughness. This probably could be explained by the fact that, in this project, we used a fine-grained alloy and, consequently, roughness due to lack of reduction in grain size would not be evident as in use of a large-grained alloy. In Figure 2, we have the percentage of each type that was extremely smooth and had less than average roughness. As stated above, and as shown here, the three-minute mix afforded much the greater percentage displaying less than average roughness.

In the consideration of tarnish, it may be said that, in general, all the fillings placed in children's mouths became dingier as time went by, but, in adults, fillings did not show increasing tarnish after the first six months. This fact, which may be attributed to lack of mouth hygiene on the part of the children, seems to emphasize the importance of mouth care as related to tarnish and corrosion.

Of the twelve fillings that had retained the original color and showed definitely less than average tarnish, seven were those triturated for three minutes. Figure 3 shows the percentage of each type that developed more than average tarnish. Here, the underamalgamated had much the highest percentage that tarnished excessively. In Figure 4, considering those fillings which had definitely less than average tarnish, the three-minute mix fillings had 31 per cent falling in this class, but the underamalgamated had only 7 per cent that were superior in terms of tarnish. This lesser

degree of tarnish in the three-minute mix fillings would be expected, owing to the smooth surface.

CONCLUSIONS

1. Small dimensional changes due to variations in the trituration time cannot be detected clinically.

2. Fillings having a flow value of 6.5 per cent gave no clinical evidence of distortion.

3. The three-minute mix produced fillings with smoother and brighter surfaces, whereas the underamalgamated, in general, developed an excessive tarnish.

4. From these clinical observations, it can be said that fillings triturated by the three-minute mix are equal, and slightly superior in smoothness and tarnish, to those mixed by the manufacturer's directions.

5. The slight differences in the fillings indicate that, with the use of proper cavity preparation, and prevention of contamination and heavy packing pressure, slight deviations from the recommended trituration time will not produce any major discrepancies.

EFFECTIVE IMPRESSIONS FOR FULL DENTURES

NATHAN H. RAYBIN, D.D.S., Cleveland, Ohio

IN a study of the literature of the past two decades dealing with impressions for edentulous jaws, one senses that the emphasis has been laid on impression materials rather than on the fundamental principles of impression procedures.

The Fournet-Tuller technic[1] was unquestionably the most thought-provoking of impression innovations. Its most important mission has been fulfilled; i.e., it has presented new and practical fundamentals for lower denture procedures and has served to interest the dentist in impression taking and to render him desirous of improving on any previous, aimless technic that he may have employed. Although it is not possible to obtain spectacular stability in all upper and lower jaws owing to variations in types and degrees of muscular control and mucosa resiliency[2] and location of bracing areas, appreciable vertical and horizontal stability can be obtained in difficult cases, and excellent stability in average mouths can be secured by the application of the known principles of impression procedure.

PRINCIPLES AND OBJECTIVE

There remains a popular viewpoint among prosthetic workers that the ideal complete impression for dentures should provide for balanced tissue support, to be obtained by placement of the softer tissues of the denture areas.[3]

We know that a plastic mass of impression material under pressure in a loosely fitted tray, which does not confine the impression material, will exert its greatest force in that region farthest from

1. Fournet, S. C., and Tuller, C. S.: Revolutionary Mechanical Principle Utilized to Produce Full Lower Dentures Surpassing in Stability Best Modern Upper Dentures. J.A.D.A., 23:1028-1030, June 1936.

2. Landa, J. S.: Practical Full Denture Prosthesis. D. Items of Int., 65:749, August 1943.

3. Applegate, S. G.: Fluid Wax Impression Technic for Immediate Dentures Utilizing Corrected Compound Tray. J. Michigan D. Soc., 21:93-95, April 1939.

the escape area.[4] The result is excessive pressure in the center of the hard palate, where it is least desired, and little pressure with no tissue placement in the border areas, where it is desirable. Therefore, in these procedures, the final correction impressions for both jaws are taken in well-fitted shellac baseplate trays that confine the impression material.

The purpose of these procedures is to construct upper and lower dentures that are comfortably stable, to obviate remaking and relining. The margins of both the upper and the lower impressions should embrace all areas of physiologic

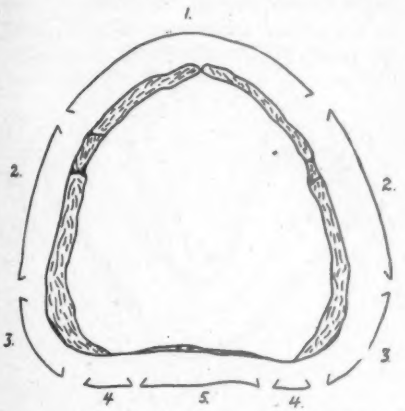


Fig. 1.—*1*, labial frenum and impression or denture margin from cuspid to cuspid. *2*, buccinator muscle and margin from first bicuspid to distal aspect of second molar. *3*, tuberosity. *4*, pterygomaxillary notch. *5*, posterior limit of impression in region of fovea palatinae.

tolerance. Any slight overextension in the finished case can be quickly corrected by trimming. Since underextension of the margins will always be one of the chief causes of denture failure, in these procedures slightly overextended impressions are the rule, especially in the lower denture.

4. Sears, V. H.: Basic Principles in Dentistry. Chicago: Pitman Publishing Co., 1942, p. 99.

Many patients expect a finished denture to be relined or duplicated within a few weeks after insertion, because of previous experiences. Such experiences are practically nonexistent when sound impression procedures become routine. By following the method about to be set forth, we are, in truth, relining the impression, thereby eliminating the necessity of relining the finished dentures.

PROCEDURE

In this procedure, the preliminary impressions, both upper and lower, are poured in model plaster, the setting time of which is from six to eight minutes. On

Fig. 2.—Rerimmed shellac baseplate tray. Areas *1* and *2* are molded simultaneously. Areas *3* and *4* are molded separately.

the upper plaster model, a double thickness shellac baseplate tray is constructed, extending just short of the reflected areas except in the posterior margin. Here the tray is extended to the exact ultimate termination of the finished denture. The upper tray is rerimmed or muscle trimmed in three distinct steps in the mouth with medium fusing modeling compound. The final correction is taken in a thick mix of zinc oxide and eugenol impression paste.

A shellac baseplate tray is constructed on the lower preliminary model. This

tray is also short of the reflected areas except at the heel and the distobuccal border. In the last named zones, the tray is extended almost to the border tissues as shown in the cast. The tray is then rerimmed with modeling compound until it demonstrates moderate stability and is not easily displaced from the mouth. An impression with zinc oxide and eugenol paste is then taken in the rerimmed tray. The final correction impression is obtained by painting medium fusing impression wax into the zinc oxide and eugenol impression and submitting the entire tray to moderate pressure.

TECHNIC

The Upper Impression.—Upper preliminary impression: An aluminum tray which is about 5 mm. too large in all directions, a tray that will permit a thickness of at least 5 mm. of modeling compound between itself and the oral mucosa, is selected and three notches are cut on the tray, corresponding to the location of the labial frenum and the two buccal frena. The handle of the tray is bent downward so that the upper lip will have free play during impression taking.

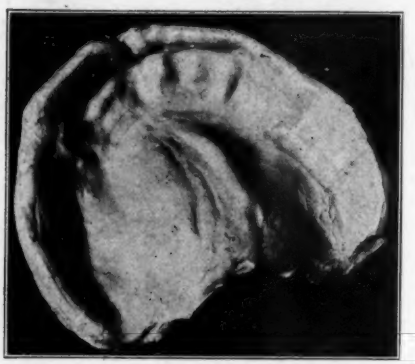


Fig. 3.—Completed upper zinc oxide-eugenol paste impression.

Medium fusing modeling compound is fused into the anterior and tuberosity areas of the ridge portion of the tray and the luted portions are "spot heated" with an alcohol trigger-type blow torch. A roll of water-softened compound is pressed tightly against the luted compound and a gutter quickly formed in the modeling compound,[5] roughly corresponding in shape and depth to the ridge, and the impression is seated. A moderate but steady pressure upward and backward is maintained with both forefingers in the vault portion of the tray for about fifteen seconds. Starting at the left tuberosity and employing the right forefinger, the operator quickly adapts the excess compound to the tissues from the tuberosity anteriorly to the labial frenum region. At the conclusion of the digital adaptation of compound, he gently pulls the cheek downward.

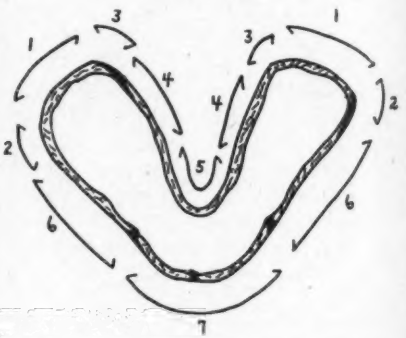


Fig. 4.—*1*, heel. *2*, distobuccal aspect; masseter and buccinator muscles. *3*, distolingual aspect; mylohyoid, superior constrictor and palatoglossus muscles. *4*, midlingual aspect; mylohyoid muscle and sublingual gland. *5*, lingual frenum. *6*, buccinator muscle. *7*, labial frenum.

This final procedure will give a definite reproduction of the overextended reflection area. The foregoing procedure is repeated on the right side with the left forefinger employed to adapt the modeling compound from the right tuberosity to the frenum. Finally, the

5. Clapp, G. W., and Tench, R. W.: Professional Denture Service. Vol. 1. New York: Dentists Supply Co., 1926, p. 32.

upper lip is grasped and gently massaged downward and inward to reproduce a definite reflection height in the area normally occupied by the six anterior teeth. The impression is slightly chilled in the mouth, and removed. In addition to full rounded borders, the upper preliminary impressions must show: (1) the entire ridge area including both tuberosites; (2) a definite posterior length up to or beyond the fovea palatinae (Fig. 1, area 5); (3) a dipping in of the borders in the two buccinator areas (Fig. 1, area 2); (4) a well-defined notch for the labial frenum (Fig. 1, area 1), and (5) a definite reproduction of the pterygomaxillary notch areas (Fig. 1, areas 4).

The compound is scraped from the anterior ridge area to a depth of 0.5 mm.,

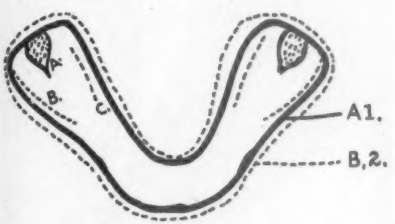


Fig. 5.—*A*, retromolar pad. *B*, external oblique ridge; *C*, mylohyoid ridge; *A1*, outline for shellac baseplate tray. *B2*, depth of reflection.

especially in the case of flabby ridges. It is not necessary to scrape compound from the palate portion unless there is present a marked torus palatinus. The impression is boxed and poured in model plaster.

Upper shellac-baseplate tray: The outline of the shellac baseplate tray is penciled on the plaster model obtained from the preliminary impression. The outline should travel along at the height of the overextended reflection in the labial, buccal and tuberosity regions. In areas 4, Figure 1, the outline should run along at the height of the depression representing the pterygomaxillary notch. Posteriorly, the outline is carried to the so-called vibrating line of the soft palate in the immediate vicinity of the fovea palatinae (Fig. 1, area 5). A sheet of double thickness shellac baseplate is adapted to the cast. All margins of the baseplate are extended to the penciled outline on the cast. With a coarse grinding stone on the lathe, all margins are reduced approximately 3 mm., except areas 4 and 5, Figure 1, which will represent the predetermined length of the impression. Then a shellac baseplate handle is luted to the tray in the space normally occupied by the two central incisors.

Rerimming the upper tray: The main

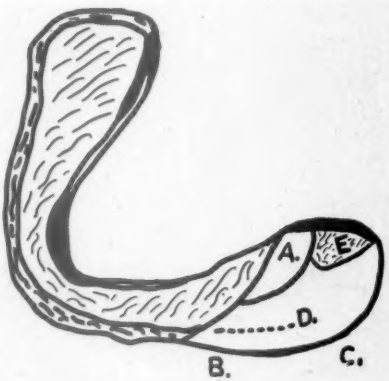


Fig. 6.—Sideview of tray. *A*, area covering distobuccal aspect of retromolar zone. *B*, midlingual zone. *C*, distolingual zone. *D*, mylohyoid ridge. *E*, retromolar pad.

object in rerimming the upper tray with medium fusing modeling compound is to obtain a definite height and to produce a replica of the relaxed reflection. Some modeling compound is luted to the posterior border of the tray (Fig. 2, area 2). This compound addition should be 3 mm. wide and 2 mm. thick. Some compound is then luted to the anterior border (Fig. 2, area 1). This compound addition should be 4 mm. high and 3 mm. thick and should extend 1 mm. below the inner margin of the shellac tray.

The two additions of compound are glazed and tempered in warm water. The tray is inserted directly into the mouth, the posterior margin being seated first and the anterior border then brought to place. First, pressure is applied directly to the postdam area. Then, the digital pressure is transferred to the center of the vault, while the upper lip is gently pulled downward and inward to muscle-trim the labial frenum and give a definite height to the anterior flange. Both areas are chilled with cold water and removed from the mouth. Next, some compound is luted to the tray border (Fig. 2, area 4) on the left side. The addition is glazed with a blowtorch and tempered in lukewarm water, and the tray is inserted in the mouth. The left cheek is gently pulled down over the warm compound, a definite border height thus being established for the left buccinator muscle. The compound is chilled slightly with cold water and removed from the month. This is repeated for area 3, Figure 2.

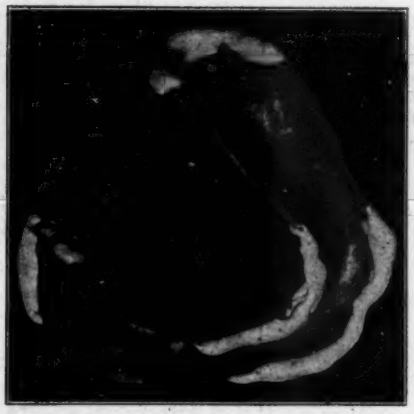


Fig. 7.—Initial step in rerimming lower shellac baseplate tray. Areas outlined in white modeling compound are molded simultaneously. All other areas are molded individually.

Such stability as is present at this stage is due to the extension of all borders to the yielding and placeable reflection areas and to the securing of a wide postdam in the posterior margin of the tray. Areas 1 and 2 (Fig. 2) were molded simultaneously so that the postdam zone would serve as a definite limit to the upward seating of the tray. Therefore, after this first step has been accomplished, it is improbable that there will be any gross overextension of any margins during subsequent procedures. If there is an excess of flabby tissue along the anterior part of the ridge, 1 mm. of the shellac baseplate is cut out with a No. 12 round bur. However, the height of none of the borders is reduced.

Upper zinc oxide and eugenol paste impression correction: The tray is dried thoroughly. A thick mix of paste is made of equal parts of the base material and the hardener. This is spatulated for one minute and then the mix is distributed over the entire tray including the borders and extending at least 4 mm. past all margins. The tray is inserted in the mouth and the posterior border is seated first. The anterior portion of the tray is brought up and the digital pressure transferred from the posterior to the anterior in the area of the anterior palatine foramen. This method of seating the

Fig. 8.—Completed lower zinc oxide-eugenol paste impression.

impression assures the operator that (1) there will be no gagging, because the correction material is well confined to the postdam area in the preliminary seating of the tray, and (2) the transfer of pressure from the posterior to the anterior portion will help the paste flow over the two buccal flanges and especially over the labial border.

The operator continues to exert a steady, moderate pressure upward and backward. At the end of approximately thirty seconds, the cheeks and lip are gently pulled down over the paste, with continued upward and backward pressure in the vault. No excessive muscle molding is necessary in taking the paste impression because the height of all borders has been determined in the rerimming process. A hook-shaped scaler is inserted in the paste material in the postdam area at the midline. (Fig. 1, area 5.) Pressure is exerted on the scaler downward and forward and the impression will be released (Fig. 3).

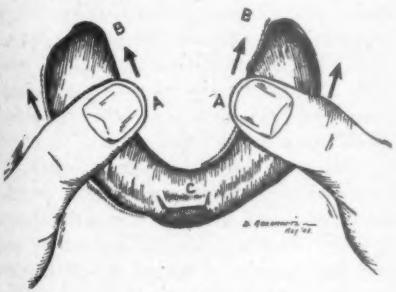


Fig. 9.—Direction of application of pressure from *A* to *B* on tray that carries wax correction. *C*, tray handle.

Small defects in the impression can be filled in with black carding wax or utility wax. Large voids in the impression are almost always caused by an insufficient amount of paste. Either a fresh mix of paste is used to fill in the voids or soft carding wax can be utilized. The impression is reinserted in the mouth and a steady pressure maintained. Upon removal, the impression is chilled in cold water.

Upper impression physiologic postdam: A section of low fusing impression wax 3 mm. wide and 2 mm. thick is softened and luted to the paste impression so that it extends from the pterygomaxillary notch of one side to the pterygomaxillary notch of the other side. The wax is resoftened with a warm spatula. The impression is inserted in the mouth and pressure is maintained in the vault for thirty seconds. Then the removing force is exerted downward and forward and the impression is released. The impression is chilled in cold water. All excess of impression wax is carefully trimmed off. The impression is now complete (Fig. 3), and it is boxed and poured in model stone.

Fig. 10.—Completed wax impression.

The Lower Impression.—Lower preliminary impression: The lower aluminum tray must be cut and trimmed so that it is closely adapted to the mucosa and follows both the upward and the lateral curvature of the ridge. Notches are cut in the tray to allow for the free play of the labial frenum and the two buccal frena. The tray is extended in the midlingual zone to 2 mm. below the mylohyoid ridge (Fig. 4, area 4). The tray should extend almost to the lingual frenum. Buccally and labially (Fig. 4,

areas 6 and 7), the tray should extend to the mucobuccal and mucolabial tissue folds. Posteriorly, the tray is extended so that it covers at least three-fourths of the retromolar pad of tissue (Fig. 5). The distobuccal portion of the tray (Fig. 4, area 2) is contoured upward so that the fossa of the ascending ramus, which lies between the internal and external oblique ridges, is completely covered. Finally, a convex curve of the margin of the tray is made at the distolingual border (Fig. 4, area 3).

Some medium fusing modeling compound is melted into the two heel portions and anterior section of the tray. A water-softened roll of compound is pressed against the luted portions of compound, and the gutter formation is immediately begun. The entire compound mass is converged directly over the ridge and pressed to place with firmness, the pressure being maintained by placing each forefinger in the bicuspid area and the thumbs under the mandible. Before the compound has hardened, the tray is held in place with the forefinger and middle finger of the left hand and the compound gently molded to the floor of the mouth in the right and left distolingual areas with the right forefinger. With the compound still in the bending stage, the patient is asked first to touch the roof of the mouth with the tongue and then thrust the tongue straight out and hold it there while the impression is being chilled with cold water. The impression is removed and chilled thoroughly in cold water. These things must be evident in the impression: (1) a well-defined distolingual and midlingual border as dictated by the action of the patient's tongue; (2) complete coverage of the entire retromolar pad of tissue and 2 mm. beyond it; (3) displacement of the buccinator and masseter muscles in the distobuccal area disclosing the external oblique ridge and the face of the ramus; (4) the entire ridge crest; (5) the mylohyoid ridge, and (6) the mucobuccal and the mucolabial tissue folds.

The impression is boxed and poured in model plaster.

Lower shellac baseplate tray: The outline for the lower shellac baseplate tray is penciled on the preliminary cast. A suitable preliminary outline would call for the extension of all borders to the depth of the moderately overextended reflection area as shown on the preliminary cast. From this point on, the lower tray trimming differs greatly from that of the upper shellac tray in that it must be tried in the mouth repeatedly to insure accurate reduction of the tray borders. First the heels are squared off so that the heel border is at right angles to the main part of the tray and the border itself covers the retromolar pad (Figs. 5 and 6). The object in covering the retromolar pad is: (1) to obtain the greatest bearing surface possible and maximum length of the denture and (2) to obtain the tolerable distolingual limit of the tray.

This procedure also permits the distobuccal angle of the tray to slip gently underneath the buccinator muscle. Areas 6 and 7, Figure 4, buccal and labial, are trimmed 2 mm. short of the reflection area.

The trimming is repeated for areas 1, 2 and 6, Figure 4, on the other side. Areas 3, 4 and 5, Figure 4, are trimmed so that the border is between 1 and 2 mm. short of the reflection area. In testing, the tray should not be displaced with moderate tongue movements. All borders except the heel are reduced because the reflected areas will eventually be reproduced in medium fusing compound. At the conclusion of the trimming, the tray will not show any vertical stability, but will demonstrate horizontal stability because the distobuccal margin is placed against the ramus (Fig. 6).

Rerimming the lower tray: Some modeling compound is luted to areas 1, 2, 3, 5 and 7, Figure 4, in the shellac

baseplate tray. The compound additions should be 3 mm. thick and 4 mm. high. The additions are glazed with a blow torch and tempered in warm water. The compound must be in the bending stage before insertion in the mouth. The tray is rotated into the mouth. The patient touches each corner of the mouth with the tongue, then thrusts the tongue straight out, while the tray is held in place by the operator's middle and index fingers. The operator then gently muscle-molds area 7 with the right hand (Fig. 7).

In this first operation, four things have been accomplished: (1) the anterior floor of the mouth and lingual frenum have been reproduced; (2) the labial frenum and border are muscle-molded; (3) the tray has been seated definitely in the heel area, and (4) the lingual pouch has been reproduced (Fig. 6, B and C).

Next, the compound is luted to area 6, Figure 4, on the left side. This addition is glazed and tempered. The tray is seated and the cheek gently molded against the compound borders. The impression is chilled with water and removed. The procedure is repeated for area 6, Figure 4, on the right side.

Finally, area 4, Figure 4, is rerimmed in such a manner that, during the molding of the left side, the tongue is thrust into the right cheek and vice versa. This gives a definite length to the tray border in the midlingual area of the mouth floor. The tray and compound border are thoroughly chilled and tested in the mouth. They should demonstrate stability and retention.

This method of muscle-trimming all borders of the lower impression tray with modeling compound may appear to be an intricate one. It is excellent practice for the inexperienced. As the operator gains experience and confidence and is able to reproduce both the lingual pouch (as governed by the mylohyoid, superior constrictor and palatoglossus muscles) and the distobuccal margins, he can dispense with the foregoing procedure, and sight-trim and mouth-trim a vulcanite tray constructed for the case from a good preliminary impression. He can then proceed with the zinc oxide-eugenol paste relining in the vulcanite tray and the final impression wax correction.

Lower zinc oxide and eugenol paste impression correction: A mix is made of zinc oxide and eugenol impression paste as was described in the upper impression and distributed evenly over the entire dry tray, the operator making certain that all margins are completely covered. The tray is rotated into the mouth and the impression seated. Considerable pressure is applied with the index fingers of both hands in the bicuspid region. The thumbs are placed under the mandible for additional support during the application of pressure. No extensive tongue movements are necessary because all border lengths have been predetermined during the rerimming process. At the end of one-half minute, the patient's tongue is thrust straight out and the cheeks and lip are gently molded and pressed against the excess of paste which has crept beyond all the margins of the tray. After the paste has set, the lower lip is pulled down and the impression removed in the direction of least resistance (Fig. 8).

The impression is rinsed in cold water. When reinserted in the mouth, it should demonstrate stability in all positions of the floor of the mouth.

Final lower impression wax correction: Before taking the wax impression correction, all rough edges of impression paste are trimmed off with a hot, sharp knife. A slowly revolving heatless stone can also be employed here advantageously. All lingual feather edges can be rounded off almost to the previously determined modeling compound margin. A small quantity of impression wax is heated in the top compartment of a

double boiler. One uniform layer of melted wax is painted into the paste impression tray. The momentary contact of hot wax and paste will not distort the paste. The melted wax is painted in one direction so as to cover all surfaces and margins that will contact the mucosa of the lower jaw.

Next, the entire tray is chilled in cold water and centered upon the jaw. No attempt should be made to seat the impression immediately. At the end of thirty seconds, the impression is vibrated gently to place and will find its own proper seat. The thumbs are placed on the upper surface of the tray and the fingers on the under surface of the mandible. A series of short one-direction rubbing strokes are initiated on the tray from the cuspid region posteriorly to the second molar area (Fig. 9), these strokes to be continued for three minutes. The impression is chilled and gently removed from the mouth. A glossy appearance of the wax signifies tissue contact. Wherever the wax appears dull, a lack of mucosa contact is signified.

All dull spots are touched up with freshly painted wax and the impression is allowed to cool, then the entire impression is covered with another uniform coat of wax. It is again chilled and the seating and stroking are repeated. The lips and the cheeks are "worked" against all borders. The patient's tongue should be thrust out before chilling with cold water. The impression is gently removed (Fig. 10). The final wax corrected impression is poured in artificial stone.

A wax impression will afford relief of hard areas and placement of soft border areas only when the tray grips the ridge securely and confines the wax. A loosely fitting tray will allow escape sluices for the wax and the end-result is an approximate reproduction of surface detail without any placement of the soft tissues, which is so vital in lower denture stability. The wax registers a flow of 98 per cent when subjected to moderate pressure in the mouth for a period of five minutes.[6] For purposes of tissue placement, the wax flow is reduced even more by subjecting the tray to pressure for three and one-half minutes only.

CONCLUSIONS

1. Impressions taken with moderate digital pressure will result in dentures that function efficiently when the tissues are strained; i.e., during the mastication of foods.

2. Impressions that are taken in closely adapted trays which confine the correction material will present a desirable placement of soft border tissues and necessary relief of nonresilient areas in the completed denture.

3. It is simpler for the dentist to reline the impressions than to refit or remake the finished denture.

10012 Euclid Avenue.

6. Dirksen, L. C.: Composition and Properties of Wax for Lower Impressions. J.A.D.A., 26:270-274, February 1939.

ANTHROPOMETRY AND THE ERUPTION TIME OF TEETH*

MORRIS STEGGERDA, Ph.D., Cold Springs Harbor, N. Y.

IN studies of the development of children, much thought is given to the amount of growth attained at various yearly milestones. There are numerous height and weight tables based on physical averages for children for each age and sex. Similarly, the degree of carpal development at a given age is now so thoroughly known that there are physiologic age charts based solely upon the development of the wrist bones. Dentists have calculated the average eruption time of teeth and have set up norms, from which a dental age is ascertained. Psychologists determine the child's mental age, correlating mental development with chronologic age.

One often hears that a child is taller and heavier than the average for his age, and he is spoken of as being precocious. If he is below average in height and weight, he is said to be retarded. This assumption that a large child develops earlier and a small child later than the average is not necessarily correct, since size is determined by inherent genetic factors which may be independent of the genes that determine the speed of growth. We realize that individual size in a given population is exceedingly variable. A tall boy of 11, who is destined to become a taller-than-average man, may have progressed no farther in his development than has a very short boy of the same age, who will become a shorter-than-average man.

In the literature, however, one finds statements tending to prove that there is a relationship among the different developmental processes. For example, Cattell[1] writes: "There is evidence to indicate that those children who are precocious in their dentition are on the average above the norm for their age in height and weight. . . . Matiegka's data show that boys who have a dental age above their chronological age are at every age heavier and taller than those whose dentition is below the norm."

I have taken physical measurements of a large number of children of various races, and, along with measurements of sixty or more dimensions, have recorded the eruption time of teeth. These records, kept for twelve consecutive years and covering the period of most rapid development, have enabled me to test the possible relationship between acceleration or retardation of dentition and the height and weight of a given child.

Averages for height and weight have been calculated for each age and sex in samples of four racial groups: Dutch White, Negro, Navajo Indian and Maya Indian.[2] For each of these groups, the average eruption time of each tooth has likewise been calculated. Thus, for any one child, it was simple to determine how much the development in height and weight deviated from the average for his age, and also by how much the eruption time of his teeth deviated from the average of the population.

*From the Carnegie Institution of Washington.

*Research aided by a grant from the William John Gies Fund of the American College of Dentists.

COMPARISON OF DEVIATIONS FROM AVERAGES FOR BOYS WHO WERE ABOVE OR BELOW AVERAGE IN HEIGHT AND WEIGHT

File Number	Approximate Deviation from Average for Each Year of Growth	Deviation in Tooth-Eruption Time from Average of Population*		
		Canines	Premolars	Second Molars
190	3 inches taller and 10 pounds heavier	+ 1.7 + 1.0 + 1.8 + 1.3	+ 3.0 + 1.5 + 1.8 + 1.3	+ 1.0 + 1.1 + 0.2 + 0.2
171	5 inches taller and 15 pounds heavier	— 0.5 — 0.4 + 0.2 — 0.1	+ 1.8 + 0.9 + 0.4 + 0.7	+ 0.4 + 0.6 + 0.1 + 0.6
61	3 inches taller and 17+ pounds heavier	— 0.2 — 0.1 + 0.6 — 0.1	— 1.3 — 0.3 — 0.8 — 0.1	+ 0.2 — 0.1 — 0.2 — 0.6
544	2 inches taller and 15+ pounds heavier		— 1.4 — 1.5 — 1.5 — 1.6	— 0.2 — 1.0 — 1.0 — 1.0
119	7 inches shorter and 18 pounds lighter	+ 1.4 + 1.5 + 0.6 + 1.4	+ 1.8 + 1.2 + 2.8 + 3.2	+ 2.6 + 3.4 + 1.4 + 0.5
69	3 inches shorter and 10 pounds lighter	+ 1.9 + 1.9 + 1.4 + 2.3	+ 0.7 + 0.6 + 2.1 0.0	+ 1.4 + 1.1 + 1.1 + 1.1
173	5 inches shorter and 11 pounds lighter	— 0.1 + 0.5 — 1.4 — 1.0	+ 0.3 + 0.8 — 2.7 — 2.7	+ 0.3 0.0 + 0.9 — 0.1
217	3 inches shorter and 6 pounds lighter		— 2.5 — 2.9 — 3.3 — 3.9	— 1.6 — 1.9 — 2.4 — 2.4

*Plus figures represent earlier development; minus figures, later development. Time is expressed in years.

Before considering the results of the statistical correlations, it was decided to select at random boys who were taller and heavier than the average, and to determine whether their teeth erupted earlier or later than the average. Similarly, boys who were shorter and lighter were selected and the eruption time of their teeth determined. These preliminary findings are shown for eight typical cases in the accompanying table.

From this table, it will be seen that, in tall and heavy boys, the teeth erupt both earlier and later than the average for the population, and that the same is true for boys who are below the average

in height and weight. I also selected boys who were very close to the average in height and weight, and found that, in some of these boys, the teeth erupted earlier than the average, while in others eruption was later than the average. It is very likely that these preliminary findings indicate the results that would be obtained if a large number of cases were selected.

With this fact in mind, an attempt was made to test the hypothesis statistically. Before this could be done, it was necessary to determine the dental age of each child. Three methods for determining dental age were tested, and correlations with height and weight were made with each method. The methods for determining dental age are briefly described below.

Method I: An arithmetical average of the average eruption ages of the teeth erupted for the individual during the period between annual examinations. Example: Three new teeth erupt: the upper right lateral incisor and both upper first premolars.

The average eruption time for an upper lateral incisor for the child's sex and race is 8.77 years.

The average eruption time for upper first premolars for the child's sex and race is 10.52 years.

His dental age is:

$$\frac{8.77+10.52+10.52}{3} = 9.9 \text{ years.}$$

Method II: The same as Method I, except that the average eruption time of the last full set, i.e., all the four central incisors or all four first premolars present before the examination period, is averaged. Example: A child at age 8 has all his first molars and all four central incisors, plus two lateral incisors. At age 9, he has two more lateral incisors and one canine. His dental age will be (in the latter case) 9.61 years (8.32 central incisors + 2(9.16) lateral incisors + 11.82 canines ÷ 4 = 9.61).

Method III: Calculation of the average age at which members of a sex and racial group have the various numbers of teeth. Thus, if a child of 11 years had twenty permanent teeth, he would have a dental age of 10.9; because 10.9 is the average age at which members of his group had that number of teeth.

It was shown that when the dental age was based simply on the number of teeth present (Method III), practically the same correlation was evident as when the more elaborate methods were used. Therefore, the correlations were made using the dental age of the child as described by the third method. Correlations were thus made of differences between chronologic and dental age *vs.* differences between the actual anthropometric measurements and the expected measurements for a given age.

The figures below show the coefficients of correlation for males and females of the four racial groups previously mentioned, based upon stature and dental age.

Dutch: 0.145 ± 0.042; 0.032 ± 0.047.
Negro: 0.297 ± 0.075; 0.244 ± 0.070.
Navajo: 0.307 ± 0.074; 0.072 ± 0.071.
Maya: 0.464 ± 0.055; 0.373 ± 0.073.

These figures are all low. Those for the Maya Indians of Yucatan are somewhat higher than the others, but I doubt whether they have any significance.

Since it was believed that the development of the face and head might be more closely correlated with the eruption time of teeth, similar correlations were made, for the Dutch Whites only, using four head dimensions; namely, head length, head breadth, bigonial width and face length. Bigonial width is the width between the angles of the lower jaw. Face length is the distance from nasion to gnathion; that is, from the upper end of the nasal bones to the chin.

The following figures show the correlation coefficients for males and females

for the four dimensions of the head. These coefficients are likewise very low. They are a significant indication that there is no correlation between the dental age of a child and the amount of his deviation from the average anthropometric measure for his racial stock.

Head length: 0.082 ± 0.043; 0.125 ± 0.047.

Head breadth: 0.060 ± 0.043; 0.126 ± 0.047.

Bigonial breadth: 0.153 ± 0.042; 0.308 ± 0.043.

Nasion to gnathion: 0.089 ± 0.053; 0.189 ± 0.055.

CONCLUSION

Anthropometrists and all other students of human growth should be exceedingly careful in using the term "precocious." The fact that an individual is large does not mean that he has developed earlier or faster. It merely means that he belongs to a different breed from that of his smaller companions. If a population were homogeneous and destined to be of the same adult size, any individual attaining adulthood earlier than the average might be said to be precocious; but with populations as variable as they are, size is not necessarily an index of precocity. Our data emphasize this fact by demonstrating the very low statistical correlation between individual size and eruption time of teeth.

BIBLIOGRAPHY

1. CATTELL, P.: Dentition as Measure of Maturity. Harvard Monographs in Education No. 9. Boston: Harvard University Press, 1928, p. 16.

2. STEGGERDA, MORRIS, and HILL, T. J.: Eruption Time of Teeth Among White, Negroes and Indians. *Am. J. Orthodontics*, 28: 361-70, June 1942.

INCISIVE CANAL CYST

FRED G. REPASS, D.D.S., M.S.D., Roanoke, Va.

History.—Mrs. R. O., aged 35, seen February 22, complained of pain and swelling in the palate about the maxillary central incisor teeth.

Canal cyst.

Examination.—A small tumor-like swelling of an inflammatory nature was noted on the palate posteriorly from the maxillary central incisor teeth. On digital palpation, a brownish cheesy material was discharged from the mass. Roentgenographic examination of the area revealed an incisive canal cyst.

Operation.—After a few days had been allowed for the inflammatory condition to subside, under local anesthesia a palatal mucoperiosteal flap was retracted and the cyst exposed, February 29. The cyst was enucleated from the incisive foramen area in its entirety. The central incisor teeth, which were vital, were not interfered with. A small portion of sulfathiazole paste was inserted in the bony cavity and the palatal flap was closed with two sutures.

Outcome.—There was uneventful healing, attended by only slight postoperative pain and discomfort.

501 Medical Arts Building.

A SIMPLIFIED APPARATUS FOR THE USE OF VINETHENE

PHILIP S. HALEY, Ph.C., D.D.S., San Francisco, Calif.

VINETHENE, or vinyl ether, also called divynyl ether, has been defined by John Adriani, M.D., of the New York University of Medicine, as a "symmetrical unsaturated organic oxide prepared from B-B¹dichlorethyl ether." As it appears on the market, ready for use, it contains a slight buffer agent which retards deterioration. This is 0.01 per cent phenyl alphanaphthylamine. To it is also added 3.5 per cent absolute alcohol. It can be purchased in brown screw cap bottles with dropper tips. In actual use, it is dropped from these tips on gauze at a rate, for early induction, of about sixty drops per minute. When an analgesic saturation has been secured, the rate may be continued at forty-five per minute.

Vinethene, used in many thousands of cases reported in the literature, seems to be free from indictment as to fatalities, although, in a very few cases, minor complications have been reported. These, to my knowledge, have always been in association with anesthesia carried to the surgical stage, or second anesthesia stage. They embody such conditions as cyanosis or complications following the use of vinethene where respiratory infections already exist. On the whole, used with the admission of plenty of air and carried only to the depth of analgesia, vinethene seems to be as safe as, if not indeed safer than, any other anesthetic agent. An exception may be ethyl chloride used in the same manner.

The action of vinethene is rapid. For a simple myringotomy (incision of the membranes), analgesia can be secured within one minute or less time, depending on the amount of air inhaled with the anesthetic. While oxygen may be used in place of air, the latter is recommended in this report.

Oxygen is a stimulant, increasing the powers of perception and sensation. It confers a sense of exhilaration, and therefore defeats the purpose of light analgesia, which is sedation. Air, inhaled at the normal respiratory rate, does not tend to prevent sedation, but is effective in preventing the patient from passing into the upper planes of the second stage, which, in the case of vinethene, will come on very rapidly without its presence or that of oxygen.

Vinethene acts very smoothly. In fact, so smooth and rapid may be the induction that it is necessary to instruct the patient to speak to the operator when asked any questions. In this way, the stage of anesthesia in analgesia may be gaged, since the patient, when in deep, or the saturation phase of, analgesia, will speak with a thick or slurred enunciation, showing a slight loss of motor control of the tongue musculature. When this symptom is noted, and when the patient feels numbness of the skin in response to a pinch, when he feels quite dizzy or when he seems to be floating in the atmosphere, operations involving slight

Report made to the California Academy of Periodontology for the Research Committee, April 19, 1944.

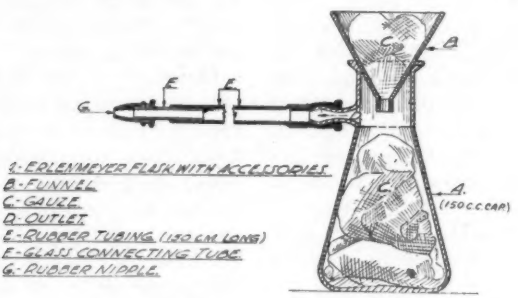
pain may be ordinarily commenced. Among these are packing pockets, puncturing pus areas, removing calculus, inserting needles or treating oral Vincent's infection.

APPARATUS

The apparatus consists of six parts: an Erlenmeyer flask of 150 cc. capacity, a small glass funnel, plain gauze, a rubber tube 150 cm. in length, a rubber nipple and a 1-inch glass connecting rod. In use, the flask acts as a mixing chamber. The flask is filled loosely with gauze. A small piece of gauze is placed in the funnel, which is placed over the mouth of the flask. The rubber tubing connects with an outlet at the side of the flask, and with the nipple at the other end. The glass tube makes the connection of the nipple with the tubing. For convenience in handling, the flask may be attached to the wall bracket or other furniture by means of adhesive plaster. This will prevent its being overturned by movements of the patient. Its distance from the patient should be sufficient to avoid inadvertent movements of the elbow or hand.

In use, the nipple is inserted in the patient's left nostril and the tubing is passed under the left arm. The right nostril is plugged with cotton. Vinethene is now dropped on the gauze in the funnel at sixty drops per minute, and the patient is asked to inhale slowly and deeply through the nose and to exhale through the mouth. It will be noted here that there will be no shock to the nasal membranes with this method, such as is usually found when vinethene is dropped on a roll of gauze and held close under the nose. Neither will there be any burning of the skin of the nose or lips, so that coating with petrolatum may be dispensed with.

The mixing effect in the flask and in the long tubing warms the gas (since the rapid volatility of vinethene converts it into a gaseous body), so that the effect of breathing it is pleasant, resembling to some degree the inhalation of nitrous oxide. The operator should begin at once to speak to the patient, in order to keep in touch with his degree of consciousness. When distinct dizziness or floating is reported, the skin may be pinched or the gums touched with a sharp instrument, and the patient questioned. After the first few inhalations, the eyeballs should be examined frequently, since an up-and-down motion of the ball indicates the onset of the first plane of the second stage of surgical anesthesia. Should it be desirable to closely approach this stage or enter it for the purpose of a simple and quickly performed extraction or any slightly more than usually painful operation, it is possible to deepen anesthesia by holding the



Erlenmeyer flask with accessories.

palm of the hand over the funnel.

When the patient speaks with a slurring or an imperfect accent, response to slight pain will be absent or so reduced that procedure may be possible. In general, in determining this point, the operator should be sure to inquire regarding the patient's feeling, should determine whether he is malingering from fear and should impress upon the patient the idea that, in order to save time in operating, he must open his mouth when he feels dizzy and superficially numb.

With a free admixture of air as above described, vinethene must be dropped regularly into the flask, since without it the patient begins to orient himself quickly. When the dentist is ready to operate, the throat should be packed with gauze, where it does not interfere with the work to be done, and vinethene should be dropped at the rate of forty-five drops per minute into the funnel.

It should be remembered that, before entering surgical anesthesia, there may be a cessation of breathing for fifteen seconds, or less, followed by regular, smooth breathing in the first plane of surgical anesthesia. Hence, should this cessation occur, the plug of cotton in the right nostril may be removed, and the operation continued, since the overwhelming amount of air in proportion to vinethene would prevent overdosage. Oxygen should be on hand, should it be needed, and artificial respiration should be used if necessary, but the need is extremely unlikely, with the apparatus used as above described. The pupillary reflex should be frequently noted.

After operation, the patient should be kept in the chair for observation for a few minutes, since his relaxed and slightly uninhibited condition may continue for ten minutes or more. Should excitement be noted, it should be remembered that this condition is the state between analgesia and the third stage, and the required procedure is the administration of less anesthetic. The drops may be reduced to twenty or less, until the patient returns to analgesia. It is, however, with most patients, difficult to cause induction to this stage, with free administration of air as described.

BIBLIOGRAPHY

ADRIANI, John: Stability of Vinyl Ether (Vinethene). *Anesthesiology*, 2:191-193, March 1941.

Vinethene. Pamphlet by Merck & Co.

LIVINGSTONE, HUBERTA M., *et al.*: Further Experience with Vinethene. *J.A.M.A.*, 115: 1353-1357, October 19, 1940.

OGUS, W. L.: *Mil. Surgeon*, 88:301, March 1941.

WELLMAN, I. VICTORIA; KABLE, VERA N., and LIVINGSTONE, HUBERTA M.: Vinethene for Dental Anesthesia. J.A.D.A., 30:1883-1888, December 1, 1943.

GOLDSCHMIDT, S., *et al.*: Divinyl Ether: Experimental and Clinical Studies. *J.A.M.A.*, 102:21-27, January 6, 1934.

210 Post Street.

THE JOURNAL *of the*
AMERICAN DENTAL ASSOCIATION

HAROLD HILLENBRAND, D.D.S., Editor
L. PIERCE ANTHONY, D.D.S., Editor Emeritus

Published by the American Dental Association
222 East Superior St., Chicago, 11, Ill.

All expressions of opinions and all statements of supposed facts are published on the authority of the writer over whose signature they appear, and are not to be regarded as expressing the views of the American Dental Association, unless such statements or opinions have been adopted by the Association.

Communications intended for publication in the scientific or literary pages of THE JOURNAL should be addressed to the Editor. All advertising or business matter should be sent to the Business Manager.

Subscription is included in the annual membership dues. The subscription rate to nonmembers is $5.00 a year in advance, this rate applying to both domestic and foreign subscriptions. All foreign subscriptions are to be paid in United States money.

DENTAL CARE IN THE NAVY

The bill "to provide more efficient dental care for the personnel of the United States Navy" by permitting the Naval Dental Corps to have control of its own affairs failed to achieve passage in the Senate after a companion bill had been passed by the House of Representatives with a considerable majority. A new bill to attain the same objectives is now being prepared by the Committee on Legislation of the American Dental Association and will be introduced at the earliest possible moment.

Many interesting circumstances worthy of comment surround the progress of this legislation through Congress, and, in addition, there seems to be some need of a clear-cut discussion of the issues involved.

Need.—The need for this legislation arose out of an almost universal discontent of naval dental officers with the outmoded, unprofessional system of naval organization that placed dental officers, technical dental personnel, dental supplies and the control of dental affairs under the complete supervision of medical officers. These methods of organization frequently worked against the Naval Dental Corps by preventing it from rendering the most efficient service of which it is capable.

This interference of medical officers in the internal affairs of the Dental Corps is made possible and perpetuated by methods of naval organization which place the over-all health of the Navy in the hands of the Bureau of Medicine and Surgery. Under this Bureau, there is the Medical Department, of which the Dental, Medical, Nurse and Hospital Corps are parts. The Dental Corps, therefore, under this

arrangement, automatically comes under the thumb of the Medical Department, which is staffed by medical personnel, who, by and large, simply do not have a professional knowledge of dental problems.

The proposed legislation merely abolished this arbitrary and unnecessary authority of the Medical Corps although control of the Dental Corps remained directly in the hands of the Bureau of Medicine and Surgery, of which the Surgeon General of the Navy is the head. Under this method of organization, the Dental Corps would have been given better control of its own personnel and affairs in the field, but would have remained an integral part of the Bureau of Medicine and Surgery dedicated to the health interests of naval personnel.

Progress of Legislation.—Not at all strangely, this legislation won the immediate and forceful opposition of the Secretary of the Navy, the Bureau of the Budget, the Bureau of Naval Personnel, the Surgeon General and, naturally, the Medical Corps. Yet so obviously just was the contention of the Dental Corps that the House Committee on Naval Affairs reported the bill favorably by a vote of 21 to 2, and the House enacted the bill by a unanimous vote.* In the Senate, hearings were also held on the bill by the Naval Affairs Committee, but no report was made before the adjournment of the last Congress.

Comment.—Several interesting facts were brought out in the testimony given at the hearings. It was shown that dental officers themselves, including the ranking officials of the Dental Corps, unanimously approved of this legislation although a few wished to proceed to the more radical step of complete separation of the Dental Corps from the Bureau of Medicine and Surgery. The testimony revealed that the list of complaints, inequalities and potential sources of inefficiency was a long one and that it could be documented with examples from both ship and shore stations.

It is interesting to note that the Medical Department itself, which strongly opposed the dental bill, wages hard and constant warfare against the attempt of line officers to interfere in its affairs, while apparently making a fetish of its supposed right to control the internal affairs of the Dental Corps. This contradictory position is inexplicable and untenable unless one agrees that it is proper for the Medical Department to have its perquisites at the expense of the dental personnel.

It is, as one of the members of Congress remarked during the hearing, "surprising" that high officials of the Naval Dental Corps would be allowed to testify in favor of the bill in spite of the fact that the bill was opposed by other departments and officials of the Navy. This is in keeping with Surgeon General McIntire's known liberal and impartial viewpoint on matters under his jurisdiction. It is to be hoped that he will extend this viewpoint to include full support for correction of the Naval Dental Corps present difficult position.

It is unfortunate that all attempts of proponents of the bill to reach an effective compromise were met by offers of legislation which, in reality, would have remedied the situation little or not at all. If the present position of the Naval Dental Corps is unjust and undesirable—and it is—every effort should be made to press for the

*The complete text of the testimony given during the House hearings will be published serially in THE JOURNAL, starting with this issue.

enactment of necessary legislation to improve it. The American Dental Association will use all of its resources to impress the soundness of these arguments upon legislators and to urge the passage of corrective legislation that is so urgently needed.

QUOTAS IN DENTAL EDUCATION

The public press in recent weeks has carried reports, not always fully informed, of certain issues that have a basic importance for every citizen as well as for the dental profession of this country. Some effects of this discussion are to be regretted, of course; but the long view will support the idea that it has been beneficial in some measure because it has called for, and received, an unequivocal reaffirmation of certain ideals and traditions that are essential to a sound concept of American democracy.

The controversy arose from inferences drawn from certain statements appearing in technical discussions of dental educational problems by the Council on Dental Education and its secretary. These statements, it was alleged, implied a desire on the part of the Council of Dental Education to establish quotas for dental schools on a religious or racial basis.

Such allegations have now been answered by unequivocal statements that members of the American Dental Association, speaking through their Board of Trustees, are "opposed to a quota system which would discriminate against students on the basis of race or religion, or on the basis of origin." They have been answered further by the statement of the Council on Dental Education that "it has not suggested in the past and will not countenance in the future the establishment of any quotas for dental schools based on race or creed."

So that there may be complete understanding of the views of the American Dental Association and of the Council on Dental Education, their statements are published here in their entirety.

The Board of Trustees of the American Dental Association is not authorized to speak for the American Dental Association, as that authority rests with the House of Delegates, which is not in session at this time.

The Board of Trustees is of the opinion that the members of the dental profession, and the Association, are opposed to a quota system which would discriminate against students on the basis of race or religion, or on the basis of origin, and indicate their adherence to the American principle that all men, regardless of race, creed or color are entitled to equal opportunity, and that their fitness to practice dentistry shall be determined solely by their capacities and attainments.

The statement of the Council on Dental Education follows:

The Council on Dental Education of the American Dental Association today issued the following statement on certain criticisms arising out of an article by the secretary of the Council, Harlan H. Horner, which allegedly contained the implication that the Council on Dental Education favored the adoption of racial quotas for the entrance of students into dental schools.

The Council on Dental Education is composed of three organizations having major interests in dental education in this country: the American Association of Dental Schools, the American Association of Dental Examiners and the American Dental Association. Dr.

Harlan H. Horner, who is secretary of the Council, has been active in the field of general education for many years in the State of New York and, for the past five years, has been engaged in a study of dental education under the auspices of the Council on Dental Education.

The Council on Dental Education deeply regrets that controversy has arisen over any of its reports and wishes to make an unequivocal statement of its position in the interests of a common understanding of the issues involved.

1. The Council on Dental Education holds that every American boy or girl, native or foreign born, who has the character, ability, aptitude and professional interest has the right to seek a dental education without any qualifications whatever based on race or creed.

2. The Council on Dental Education has not suggested in the past and will not countenance in the future the establishment of any quotas for dental schools based on race or creed.

3. The Council on Dental Education does wish, however, to call attention to a problem in this connection that does have a direct and important bearing on dental health for the American people. There is now a well recognized shortage of dentists when compared to the potential need among the population for dental care. Such a shortage cannot be met in the interests of better dental health other than by the admission of all qualified applicants into the dental schools of the country. The Council has adhered to this policy since its inception in 1937.

Many counties in the country are without dentists or without sufficient personnel to provide even rudimentary types of dental care. This situation, the Council holds, is not in the best interests of the health of the country. It is, therefore, the official policy of the Council not to restrict the entrance of qualified students in any part of the country, but rather to encourage the neglected and undermanned areas to assume their responsibilities to dental health. This can best be done by aiding such areas in sending qualified students to dental schools in the hope that they will return to these areas for the practice of dentistry.

The record of the Council on Dental Education shows its continuing interest in the improvement of dental education in this country. Such improvement will not be served, in the opinion of the Council, by the selection of students on the basis of race or creed. The Council on Dental Education completely disavows such a motive on its own part or on the part of its employes. The Council has made a substantial contribution to the war effort by aiding the program to secure more dentists for the armed forces. The Council deplores any statements which would imply that it favors any program that would impair the permanent values for which this war is being fought.

In the face of these straightforward statements, no good purpose can be served by the prolongation of this discussion on a personal or emotional basis. The facts that have been involved in this issue should be used as the basis for the final and open disposition of the matter so that no permanent injury will come to any individual, to the profession's traditional tolerance or to the progress and improvement of dental education in this country. Out of such a frank examination and discussion will come a deeper respect on the part of all for the American tradition of freedom for all races and creeds. It is only on such a basis of freedom and tolerance that dental education in this country can go forward in the training of young men and women for their role in giving better dental care and serving more of the American people.

ASSOCIATION ACTIVITIES

RESEARCH COMMISSION

STATEMENT ON DENTAL STATUS OF FLUORINE

A statement regarding the dental status of fluorine for the information and guidance of public health officials, research workers and the profession at large has been issued by the Research Commission of the American Dental Association through M. D. Huff, chairman, and Daniel F. Lynch, secretary. The statement was prepared at the request of the Executive Board of the Research Commission by the following committee: B. G. Bibby, H. T. Dean, T. J. Hill, Philip Jay, H. B. G. Robinson and Paul C. Kitchin, chairman.

The text of the statement follows:

During the past five years, much evidence has been presented that the natural presence of 0.5 part per million of fluorine or more in a public water supply is associated with a low prevalence of the dental caries experience in teeth which developed while such a water supply was used. Where the fluorine has not exceeded 1.0 part per million, this low dental caries experience is not associated with an objectionable degree of dental fluorosis. When the fluoride concentration exceeds about 1.5 parts per million, increasing amounts of a white opaque type of enamel become evident. Users of water containing over 2.0 parts per million of fluorine show sufficient disturbance in enamel formation, with subsequent staining of the tooth enamel (mottled enamel), to offer a dental public health problem warranting correction. Even under the highest concentrations found naturally in water supplies in the United States, no untoward systemic effects have been reported of consumption of such water over long periods of time. We are, therefore, in a position to state that the natural occurrence of 1.0 part per million of fluorine in a water supply is a desirable condition for the development of caries-resisting teeth. Furthermore, this amount is not in excess of the permissible maximum allowed by Public Health Service drinking water standards.

It seems reasonable to assume, on the basis of this wholly presumptive evidence, that the artificial adjustment of fluorine in water supplies not having less than 1.0 part per million would reduce the future dental caries rate and have no undesirable results. This presumption must be tested by demonstration studies such as are now under way in Grand Rapids, Mich., and Newburgh, N. Y. Until proof is at hand, we cannot officially recommend that fluorine deficient public water supplies be adjusted to a 1.0 part per million of fluorine in the interest of dental health. It should be noted that only two-thirds of this country's people use public water supplies, and hence one-third would be excluded from any possible benefits of this method of fluorine therapy. Moreover, an entire water supply must be treated at a cost of approximately 7½ cents per capita per year, even though only a relatively small amount is used for cooking and drinking purposes. However,

these objections will be of slight importance if the fluorine adjustment of water supplies in such demonstration cities as Grand Rapids and Newburgh prove that the incidence of dental caries can be markedly reduced.

There seems to be no good reason to discourage any community that wishes to make this probably beneficial and innocuous change in its public water supply, provided they understand that what they do is still in the realm of experimental procedure from both the dental standpoint and the engineering problems involved in the introduction of the fluoride and the maintenance of a uniform fluorine concentration in all parts of the water system. Adequate caries records on 12-14 year old natives, taken on teeth developed before and after fluorine adjustment of the water supply, should be an important part of any such undertaking.

The results of the use of repeated topical applications of strong (1.0-2.0 per cent) fluorine solutions in children's teeth, in the hope of reducing future dental caries, are promising, but rest on a small number of clinical tests and subsequent observations covering only a few years. We are not impressed by any harm that might follow the dentist's careful use of fluorides in topical application, but we would stress the fact that they are poisonous and so are not safe agents to put in the hands of the public. The published data would justify the experimental use in the dental office of topical fluoride treatment of children's teeth as a possible aid in future dental caries experience.

The use of fluoride by the dentist as a desensitizing agent for tooth structure seems justified by published data and clinical tests.

Both topical application and desensitizing values of fluoride deserve, and must have, further investigation before they can be used to fullest advantage.

B. G. Bibby
H. T. Dean
T. J. Hill
Philip Jay
H. B. G. Robinson
Paul C. Kitchin, *Chairman*

The foregoing statement was prepared at the request of the Executive Board of the Research Commission for the information and guidance of public health officials, research workers and the profession at large.

M. D. HUFF, *Chairman*
DANIEL F. LYNCH, *Secretary*
January 1, 1945

COUNCIL ON DENTAL THERAPEUTICS

Federal Trade Commission Issues Order Prohibiting False Claims for "Serutan"

THE Federal Trade Commission has issued an order prohibiting the dissemination of false advertisements which represent that the widely advertised product "Serutan" is a cure or remedy for constipation.

Respondents named in the order are Healthaids, Inc., of New Jersey, 404 Tonnele Ave., Jersey City, manufacturer and distributor of Serutan, and The Journal of Living Publishing Corporation and Victor H. Lindlahr, both of 1819 Broadway, New York, who were found by the Commission to have cooperated with Healthaids, Inc., in advertising the preparation. Lindlahr is

editor of the magazine *Journal of Living* and author of books, pamphlets and circulars published and sold by the publishing company, and is employed by Healthaids as a radio lecturer. He receives compensation from both corporate respondents and actively promotes the sale of Serutan to the public. He is a director of the publishing company, as are Matthew Rosenhaus and Maurice Haas, president and treasurer, respectively, of the Healthaids corporation.

Findings of the Commission are that in 1918 Lindlahr was licensed to practice as an osteopath in Illinois and in 1923 obtained a degree of doctor of medicine from the St. Louis College of Physicians and Surgeons, and although he admitted at the trial of the case that he knew this institution was a "diploma mill" and he has never been licensed to practice as a doctor of medicine, he testified that he considers himself entitled to use his M.D. degree for writing purposes.

According to the findings, the Healthaids corporation, through its radio programs, directly advertises Serutan, features Lindlahr as an "eminent diet authority" and "famous editor of *Journal of Living*" and promotes the magazine and various Lindlahr books and pamphlets; Lindlahr in his broadcasts and writings promotes Serutan and the magazine *Journal of Living*, and the magazine directly advertises Serutan and promotes Lindlahr and his writings, which in turn promote Serutan. "The essence of the entire arrangement," the findings state, "is to promote the sale and distribution of Serutan, and to do so in as indirect and apparently disinterested guise as possible." Through these processes, the Commission finds, the respondents actually are able to sell to the public publications which are fundamentally advertisements of Serutan disguised with various titles and which point out how essential the product is to whatever the purpose of the booklet may be—beauty, health, longevity, weight reduction or weight gain.

As to the respondents' claims for the benefits to be derived from the use of Serutan, the Commission finds, among other things, that the product consists of equal parts of rice polishings and the epithelial tissue of psyllium seed, and is not a cure or remedy for constipation, its therapeutic value being limited to the temporary relief afforded by its laxative action.

"When taken as directed," the findings continue, "Serutan acts as a mild irritant, bulk laxative. . . . A small portion of the indigestible residues of Serutan is broken down into volatile fatty acids which irritate the intestinal walls. The crude fibers contained in the rice polishings also have a direct irritant effect upon the intestinal walls. The bulk and irritant properties of Serutan thus tend to stimulate peristaltic action and result in bowel movement.

"Constipation is usually a symptom of some other trouble and the proper method of treatment is to ascertain the cause, if possible, and correct it. . . . Though a person suffering from constipation may secure temporary relief from the use of Serutan or some other laxative, if the cause of his constipation is not corrected, he will revert to a state of constipation when he ceases to take the laxative."

The Commission's order directs the respondents to cease and desist from disseminating any advertisement which represents directly or through inference that Serutan (1) is a cure or remedy for constipation, will restore or maintain natural elimination, will promote normal or regular action by the digestive or eliminative organs or muscles or has any therapeutic value in the treatment of constipation in excess of the temporary relief afforded by its laxative action; (2) will strengthen the digestive or eliminative organs or muscles, or (3) will stimulate the digestive or eliminative

organs or muscles. (The last prohibition is not to be construed as prohibiting representations that Serutan tends to stimulate peristaltic action by the intestines.)

Order 4332 January 23, 1945.

Council on Dental Therapeutics Reports on Gingivitis Following Use of Ipana Toothpaste

THE Bristol-Myers Company and the Food and Drug Administration received copies of the Council's report before it was submitted for publication. The Bristol-Myers Company replied, stating in part, ". . . the glycerine content of Ipana since March 30, 1944, has been the same as that habitually prevailing in peace time." The Food and Drug Administration wrote, on January 16, 1945, in part as follows: "Early in 1944 the Food and Drug Administration received from the Council on Dental Therapeutics and from other sources complaints of gingival irritation following the use of Ipana Tooth Paste. We made an extensive investigation and found from the firm's records that during a part of 1943, because of the shortage of glycerin, the percentage of this ingredient was cut approximately in half. Our investigations did not demonstrate the cause of the irritant action other than that it was probably related to the alteration in the percentage of glycerin. The samples submitted by the Council, as well as others, produced irritation of the oral mucosa on animals and man. At the time we made our investigation, however, the firm had again changed the formula, and tests we made of the new product did not result in irritation. We have acquired information concerning the experience of users over a period of several months and no further injuries were reported until approximately ten days ago when we received another complaint. We have instructed our field representatives to conduct another investigation."

The following report of the Council on Dental Therapeutics has been authorized for publication.

DONALD A. WALLACE, *Secretary.*

Several items concerning Ipana Tooth Paste have appeared in the Council's section of THE JOURNAL (December 1934, p. 2223; September 1937, p. 1557; December 1942, p. 2244; July 1943, p. 1109; November 1943, p. 1768.) The product is not accepted by the Council.

The following letter, dated February 11, 1944, was received from a dental officer in the U. S. Navy:

I am enclosing a tube of toothpaste which has been picked at random from the shelves of our Ship's Service Store. Recently I have had a great number of men report to me with complaints of "burning mouths." On examination, the oral mucosa is, indeed, very reddened and inflamed and, upon questioning the habits of each, I find they have been using tooth paste of the same brand enclosed here. After discontinuing the use of this product, each case has cleared of its own accord in a day or two.

I am interested as to the cause of this trouble and thought perhaps an analysis of the contents of this tube would help solve the problem and perhaps be of some interest to the Council on Dental Therapeutics. I am further interested in knowing if the contents of this tube is the same as generally marketed by this firm or if perhaps it is peculiar only to an "occasional bad batch."

I would appreciate any help you may give me on the matter and until I have received your word back, you can be assured sales of this product will be held up in this camp.

The letter and the sample, which was a tube of Ipana Tooth Paste, were sent to the Food and Drug Administration, Washington, D. C. It is our understanding that the firm was approached by the Food and Drug Administration and that an investigation was conducted.

An official letter dated September 9, 1944, received from another dental officer in the Navy, reads in part as follows:

1. It has been found that many cases of painful irritation of the mucous membrane of lip and labial surface of the gingivae have resulted from the use of Ipana tooth paste. This inflammation subsides immediately on discontinuing the use of this product.

2. In going into this matter further, almost every dental officer we have contacted in New Guinea and various other bases in the South and Southwest Pacific area and this hospital in Australia has noticed this general complaint.

3. We are interested in knowing why this particular brand produces this condition, therefore we would appreciate that a qualitative and quantitative analysis of this product be sent to this activity.

The information contained in this letter was directed to the attention of the Food and Drug Administration.

October 4, 1944, a letter was sent from the Council office in answer to the inquiry of September 9. Copies of the Council's reports on Ipana Tooth Paste and statements of composition taken from the files of the Council were included. The letter read in part:

It is our impression that the formulas for many of the tooth pastes which are not accepted by the Council on Dental Therapeutics have been changed, perhaps many times, during the past few years, owing partly to the fact that it has not been easy for the manufacturers to obtain all raw materials in the quantity and quality which they prefer to use.

It is doubtful whether it would be of assistance to you for us to analyze the product as it is found on the market in the United States because you would have no assurance that the findings would apply to the product which is being used by the men in the Armed Forces in the Southwest Pacific.

The letter also included information concerning accepted brands of tooth pastes.

September 26, 1944, an inquiry was sent from the Council office to the Bristol-Myers Company asking them for statements of composition of Ipana Tooth Paste as it was being supplied to members of the Armed Forces. The firm replied in a letter dated October 5, 1944, but did not reveal any of the ingredients of the product.

The following letter, dated December 27, 1944, has been received from the Office of the Surgeon General of the Army:

This office has received reports from three different sections of the country where military personnel are stationed that the constant use of Ipana tooth paste causes a gingivitis which does not respond to treatment unless the use of this tooth paste is discontinued.

The Bristol-Myers Company was contacted when the first complaint was received and they stated that the reduction in the amount of glycerine (War Production Board restrictive order) might produce a more escharotic or irritating effect by the essential oils causing this gingivitis.

Three tubes are being forwarded to you under separate cover and it will be appreciated if you can have it tested and report to this office the advisability of permitting its use by the Armed Forces.

An investigation of the product is being conducted by the A.D.A. Bureau of Chemistry. Since there is no certainty that the product is of uniform composition, it appears to be almost impossible to obtain reliable representative samples for examination. It is planned to publish other reports on Ipana Tooth Paste as further significant information becomes available.

Council on Dental Therapeutics Adds New Articles to List of Accepted Dental Remedies

The Council on Dental Therapeutics of the American Dental Association announces the inclusion of the following articles in the list of Accepted Dental Remedies:

PENICILLIN AND RELATED PREPARATIONS

Penicillin.—A solid extract of organic nature obtained from a certain species of *Penicillium* which is able to inhibit the growth of and even occasionally actually destroy certain bacteria. It may be prepared as several salts, including sodium, calcium and ammonium salts.

ACTIONS ON MICRO-ORGANISMS: Penicillin is bacteriostatic systemically and locally for micro-organisms. It differs from sulfonamides in that its bacteriostatic action is not inhibited in the presence of para-aminobenzoic acid, pus, tissue products or body fluids or any number of bacteria. It has been found effective against certain sulfonamide-resistant organisms.

Penicillin is most effective in infections due to staphylococci sensitive to it, with or without bacteremia, to hemolytic and anaerobic streptococci, clostridia, pneumococci, gonococci and meningococci. It is also effective in early and late syphilis, and in actinomycosis, but its permanent value in these infections has not been established. Penicillin is not effective against the colon-typhoid group, tubercle bacillus, acne bacillus, malaria, trypanosomes, viruses and many other organisms.

INDICATIONS IN INFECTIONS: Penicillin is indicated in infections due to micro-organisms sensitive to it, but in dentistry these indications have not been clearly defined. Its use is not necessarily the first measure or the measure of choice in abscess, osteomyelitis, cellulitis and other dental and oral infections. Surgical intervention may be, and often is, preferable in these conditions. After surgical intervention, penicillin may be used to promote recovery and shorten convalescence, especially in sulfonamide-resistant cases. However, sulfonamides may be equally effective and should be used as long as the availability of penicillin is limited. Many oral bacteria are reported to be penicillin sensitive, but the therapeutic value of applications in local infections is not definitely known. It is asserted that the use of 5,000 units as a mouth irrigant once a day has as great local effectiveness clinically as the administration of large intramuscular doses.[1]

LOCAL EFFECTS: Locally, penicillin in solution is practically noninjurious to isolated organs, tissues, erythrocytes, leukocytes and yeast cells, in concentrations much greater than those bacteriostatic in blood. Dry sodium penicillin is irritating locally owing to its alkalinity. Calcium penicillin is asserted by some to be less irritating, but this is denied by others. Calcium penicillin is more toxic systemically than the sodium salt. Hypersensitivity has been reported with crystalline sodium penicillin.

SYSTEMIC TOXICITY AND ACTIONS: Systemically, penicillin is virtually nontoxic. Occasional chills, fever, headache, flushing of the face, urticaria and thrombophlebitis at the site of injection are ascribed to the presence of impurities. Pain may occur at the site of intramuscular injection. In animals, toxic or fatal doses far exceeded therapeutically effective doses in man.

Absorption of penicillin by unbroken skin and mucous membranes is not demonstrable, but occurs readily after intramuscular injection and somewhat less rapidly after subcutaneous. It is irregular and incomplete when the drug is given orally. Intravenous injection results in high initial concentration in the blood followed by a gradual fall, only a trace being left in the blood after from two to three hours. No penicillin, or only a trace, is found in saliva, tears and cerebrospinal fluid. The fate of penicillin in the body is not fully understood, but from 40 to 60 per cent of the unchanged product is excreted in the urine in twelve hours. The rapid excretion requires frequent injection for satisfactory therapeutic results. In determining the usefulness of penicillin in dentistry, it is desirable to determine the blood levels of penicillin.

DOSAGE: Penicillin may be administered intramuscularly, intravenously and topically. Injections must be given repeatedly, every three or four hours. By vein, injection may be given as a continuous intravenous "drip." As a rule, the initial dose should be high, since the micro-organisms may become resistant with low concentrations or small doses. The infection should be brought under control as quickly as possible.

For intravenous use, one or more ampuls are dissolved in sterile, pyrogen-free distilled water or physiologic salt solution. Concentrations of 1,000 to 5,000 units per cubic centimeter are prepared for direct injection, or 25 to 50 units per cubic centimeter for continuous intravenous "drip." For intramuscular injection, 5,000 units per cubic centimeter of physiologic salt solution is used. For topical application, sodium penicillin, 250 units or more per cubic centimeter

1. Sophian, L. H.: Am. J. M. Sc., 208:577, November 1944.

of physiologic salt solution, is used. (The powder form of the sodium salt cannot be used locally as it is too irritating.) Penicillin solutions should not be used for irrigation.

The treatment and dosage of penicillin vary considerably with the severity of the infection. A large intravenous dose may be given at once, such as 15,000 to 20,000 units, followed by continuous intravenous infusion, or by repeated intramuscular injections of the same high dosage. It may even be desirable to predetermine the sensitivity of the invading organism. After the temperature has returned to normal, the penicillin may be stopped, but the course of the disease must be watched carefully. Treatment depends on the result of examination of the exudate. The use of other measures should not be overlooked.

Penicillin (Sodium Salt)—P. D. & Co., in vials or ampoules, each containing 100,000 Oxford Units.
Manufactured by Parke, Davis & Company, Detroit, Mich.

Penicillin (Calcium Salt)—Pfizer.
Penicillin (Sodium Salt)—Pfizer.
Manufactured by Chas. Pfizer & Co., Inc., Brooklyn, N. Y.

Penicillin (Sodium Salt)—Schenley, in 25 cc. vials, each containing 100,000 Oxford Units.
Manufactured by Schenley Laboratories, Inc., New York, N. Y.

Penicillin Calcium—Squibb, 100,000 Oxford Units.
Penicillin Sodium—Squibb, 100,000 Oxford Units.
Manufactured by E. R. Squibb & Sons, New York, N. Y.

DENTIFRICES*

Mer Dentifrice: Composition: Each 100 grams is stated to contain precipitated calcium carbonate, 33.6 Gm.; castile soap, 23.0 Gm.; glycerin, 21.0 Gm.; alcohol, 19.7 Gm.; saccharin, 0.4 Gm.; sodium benzoate, 0.2 Gm., and flavors (menthol, thymol, tincture of myrrh, oil of peppermint, oil of cassia, oil of anise and oil of rose geranium), 2.1 Gm.
Manufactured by L. D. Caulk Company, Milford, Del.

Admission of a product to the list of Accepted Dental Remedies means that the product and the methods by which it was marketed at the time of consideration were not found to be in violation of the Council's published rules. Accepted products are reconsidered periodically. The files of the Council contain information on many drugs and dental cosmetics. All information is available, upon request, and inquiries are welcomed. A postal card inquiry will bring a prompt reply.

DONALD A. WALLACE, *Secretary.*

*A.D.R. Ed. 10, p. 95.

DENTAL EDUCATION

COLUMBIA UNIVERSITY ANNOUNCES "INTEGRATION" OF DENTAL AND MEDICAL SCHOOLS FACULTIES

Developing an educational policy which aims to strengthen dental education, research and practice, Columbia University has integrated the Faculty of Dentistry with the Faculty of Medicine, it is announced by President Nicholas Murray Butler, after action by the university board of trustees.

"The requirements of the dental profession for training and licensure are closely parallel to those of medicine," Dr. Butler explained. "Many of the advances in the biologic, chemical and physical sciences are as applicable to research and teaching in dentistry as they are in medicine.

"The sciences of anatomy, bacteriology, pathology, pharmacology, physiology, endocrinology and nutrition are as much dental as they are medical subjects. The close relationships of clinical dentistry and medicine are common knowledge. That these two major health professions should be closely coordinated is most appropriate."

The staff in dentistry will retain its

identity as a professional group within the faculty of medicine, and will have departmental autonomy in carrying out the university's educational program in dentistry, which will be continued under the name of the School of Dental and Oral Surgery, according to Dr. Butler. This program, he explained, recognizes the great importance of continuing the independence of dental practice and the preparation of dentists in courses of instruction shaped to meet their own particular needs.

"To accomplish this," he pointed out, "the staff of clinical instructors will continue to be fully qualified dental teachers who will occupy positions in the university, medical faculty and teaching staff entirely comparable to those of their colleagues in medicine or public health. Students will be selected for admission to the dental profession independently of those applying for medical training, and the present high standards of admission will be preserved.

"The entire curriculum of four years of dental studies will be under the guidance of a committee on dental education, a majority of whose members will be chosen from the dental staff. This committee will make recommendations as to the qualifications and admission requirements for dental students, the course of instruction and the candidates for the degree of doctor of dental surgery, and will be responsible for directing the educational program in dentistry.

"Members of the department of dental and oral surgery will have seats on the faculty of medicine. A member of the department of dental and oral surgery will be appointed as associate dean for dental and oral surgery, and will be the executive officer of this university department of instruction."

The decision of the trustees of the university aims to insure the active interest and support for dental education and research of the strong staff of physicians, surgeons, scientists, nurses and public health leaders who comprise the faculty of medicine at the medical center and to emphasize the importance of dentistry itself, Dr. Butler said.

"This group can contribute very greatly to the development of a stronger program of dental education in the university. At the same time, the efforts in medical training and nursing education, public health instruction and graduate medical training will be benefited by the active participation of dentistry in these closely related fields of professional activity.

"There appear to be real advantages, and particularly promising opportunities, in the integration of the school of dental and oral surgery with the other departments and schools at the Medical Center, such as have already been developed in public health, tropical medicine, graduate and postgraduate medical education, nursing, cancer research, physical medicine and other major activities, all of which can also contribute to the strengthening of dental teaching and research.

"The medical and surgical staffs of the hospitals at the Medical Center recognize fully the need of better dental services for ward and clinic patients, many of whom suffer from a combination of dental and medical conditions. Closer coordination of medical and dental care for these patients is important and can be accomplished much more readily through unified action and direction."

Dentistry is now one of the most important professions in the health program of the country, Dr. Butler declared. "It has made noteworthy contributions to individual health and comfort. It has become increasingly necessary in broad programs of community health. During its hundred years of existence the dental profession has made steady progress in developing high standards of skill and public service.

"The rapid developments of graduate and postgraduate medical education during the recent years are paralleled by similar programs in dentistry, but these independent plans should be closely related in hospitals, clinics and laboratories. The demands for graduate and postgraduate training for exservice medical and dental officers in the near future will be urgent. The program of Columbia University in the various graduate fields of medicine and dentistry will make important contributions in the postwar period of adjustment for exservice physicians and dentists. It can best be carried through under a single coordinating faculty."

The decision of the trustees of the university, Dr. Butler concluded, represents the final step in the integration of dental education and research with the medical program at the Columbia-Presbyterian Medical Center, which was visualized when the dental school was made a part of the Center in 1928.

COMMITTEE ON LEGISLATION

SURVEY OF BILLS PENDING BEFORE FEDERAL CONGRESS

The following survey of bills pending before the Federal Congress has been prepared by the Committee on Legislation of the American Dental Association.

H. Res. 12, introduced by Representative Celler, New York, sets up a committee of seven members to study, investigate and report upon the purposes and effects of the present tax rates and benefits of the Social Security Act.

S. 191, introduced by Senator Hill, Alabama (for himself and Senator Burton, Ohio) proposes an appropriation of $110,000,000 to aid states in surveying their hospitals and public health centers and for planning construction of additional facilities.

S. 294 authorizes the Administrator of Veterans' Affairs to furnish discharged veterans of any United Nations government with medical, surgical and dental treatment, hospital care, prosthetic appliances and other benefits; these benefits to be paid for by the government requesting them.

H. R. 284, introduced by Representative Randolph, West Virginia, provides for health programs for government employes.

H. R. 395, introduced by Representative Dingell, Michigan, contains the main provisions of the Wagner-Murray-Dingell bill of the last session.

H. R. 491, introduced by Representative Lemke, North Dakota, prohibits experiments upon living dogs in the District of Columbia.

H. R. 676, introduced by Representative Allen, Louisiana, exempts persons in the military and naval forces of the United States from federal income taxes.

H. R. 713, introduced by Representative Dickstein, New York, provides for the establishment of a medical training school for the instruction of physicians for the armed forces and the Public Health Service in each of the corps areas.

H. R. 1391, introduced by Representative Miller, Nebraska, creates an executive department to be known as the Department of National Health and centralizes in it all activities of the federal government related to health.

H. R. 1704, introduced by Representative Sparkman, Alabama, provides for the appointment of female dentists in the Dental Corps of the Army and Navy.

S. 190, introduced by Senator Murray, Montana, establishes a national institute of dental research.

BUREAU OF PUBLIC RELATIONS

BUREAU ISSUES NEW INDUSTRIAL POSTER

"Good Care Makes Them Last Longer" is the title of a new industrial poster just issued by the Bureau of Public Relations. Developed by the Bureau in cooperation with the Council on Dental Therapeutics, it highlights the fact that "Mouths Like Machines Must Be Kept Clean."

Besides presenting information on the type of toothbrush and dentifrice to use, it illustrates an acceptable toothbrushing method. The poster is 12 by 18 inches and is printed in black and red. While it is designed primarily for industrial use, it will prove equally effective in high schools. Single copies sell for 15 cents. Write to the Bureau of Public Relations for quantity prices.

KANSAS DENTAL DIVISION ISSUES NEW DENTAL POSTER

An attractive three-color poster for use in grade schools has been issued by the Division of Dental Hygiene, Kansas State Board of Health. The poster, which is 9½ by 12½ inches, emphasizes daily care, dentist's care and proper diet. Permission to reproduce it will be granted on application to the Dental Division.

ARMY DENTAL CORPS

NOMINATE R. M. McDOWELL AS DENTAL BRIGADIER GENERAL

Col. Rex M. McDowell, Assistant Director of the Dental Division, Surgeon General's Office, was nominated by the President January 25 for promotion to the temporary rank of brigadier general. General McDowell will be the third officer to attain general officer rank. The nomination has been approved by the Senate Committee on Military Affairs and will soon go to the Senate for confirmation.

A graduate of the Dental School of

Ohio State University in 1916, General McDowell was appointed a first lieutenant in the Regular Army November 10, 1916; was advanced to major October 6, 1917, and was promoted to lieutenant colonel October 27, 1936, to temporary colonel June 26, 1941 (AUS) and to permanent colonel October 27, 1942.

General McDowell served on the Mexican border (1916-1917) at Brownsville, Texas, and was overseas in France for twenty months during the First World War. Besides his service at various posts in the United States, he served a tour of duty in the Philippines 1925-1927 and in the Hawaiian Department 1937-1939. Completing his service in Hawaii, General McDowell was assigned to duty in the Surgeon General's Office in Washington. He is also a graduate of the Army Industrial College, class of 1932, and of the Army Dental School (advanced graduate course) in 1937.

COUNCIL ON DENTAL HEALTH

THREE STATE COUNCILS ON DENTAL HEALTH REPORT PROGRESS OF THEIR ACTIVITIES

The following summary of reports from the councils on dental health of three states has been issued by Allen O. Gruebbel, executive secretary of the Council on Dental Health of the American Dental Association.

MASSACHUSETTS.—The Council on Dental Health of the Massachusetts State Dental Society has been reorganized with Harold J. Cronin as its chairman and a representative from each of the district societies as a member. The major issues involved in the dental health problem and the various possibilities for developing a dental health program in Massachusetts were discussed during an all-day meeting held in Boston recently. The following actions have been taken or will soon be initiated:

1. The January 1945 issue of the *Bulletin of the Massachusetts Dental Society* was devoted to dental public health.

2. Cooperation is being sought with the Massachusetts Medical Society and the Massachusetts State Department of Public Health.

3. Education leaflets carrying a public health message will be supplied to dental dealers for distribution to dentists.

4. A public health exhibit will be displayed at the annual meeting of the state society. The public will be informed through the use of radio and newspaper announcements.

5. Discussions on public health problems will be scheduled at Rotary, Kiwanis and Advertising Club meetings.

6. A survey will be made relative to the distribution of dental personnel in the state.

7. Data on dental treatment facilities will be compiled to determine the extent to which clinic service is available.

By the use of a questionnaire, information will be obtained on the number of full and part time employed dentists and hygienists, and the types of dental treatment services performed in the various communities in the state.

LOUISIANA.—The results of a survey, as reported by the state council on dental health, reveal that approximately 95

per cent of school children are in need of dental treatment. The report also reveals that "although there are 984 licensed dentists in the state, 375 are serving with the armed forces, leaving about 609 to care for the needs of approximately 2,363,000 persons." It continues: "If the dentists now in practice in Louisiana were distributed according to the 1940 population, there would be 2,880 persons per dentist in the state. Fifty-three per cent of Louisiana's dentists are located in New Orleans and Shreveport, but these two cities contain only 25.6 per cent of the state's population. A total of 712,210 persons between 6 and 20 years of age need an average of more than one filling each year in addition to the accumulation of three fillings and five extractions per person. However, at the present time, only 4 per cent of the children have received treatment and only 2 per cent have received adequate dental care."

The report concludes: "It seems reasonable to assume that the discrepancy between the needs of children and what they actually get is due in a large measure to the shortage of dental personnel." The report strongly urges the revision of present regulations relative to the deferment of dental studies."

NEW HAMPSHIRE.—The membership of the state council on dental health consists of a representative from each district society, the state supervisor of school health, the director of the dental division of the state board of health and the president of the state dental society.

The chief activity thus far has been the high school Victory Corps Dental Fitness Program, which has been put into effect in every high school in New Hampshire through the cooperation of the state department of education and state board of health.

In a recent report, the chairman of the state council expressed the opinion that "more national support and additional educational material are needed," continuing: "When the district chairman confers with his local high school authority, he may show the moving picture, speak to the student body, distribute literature and have the complete cooperation of the school authorities involved, but he does not have the authority nor is he in a position to follow up this work in a direct manner. He may depend upon a school official to provide a follow-up service with the students involved, but from this point on there may be a decline in enthusiasm, interest and results."

COMMITTEE ON ECONOMICS

STUDY DEMAND FOR SERVICES UNDER HEALTH INSURANCE PLAN

Two Canadian towns, one of which provided medical care for its citizens under private practice and the other under a health insurance plan, were the object of a one-year survey recently completed by a group of Canadian research workers to ascertain the effect of health insurance on the demand for services. The two towns provided ideal laboratory conditions for such a study because of the similarity in geographic, economic and other factors.

The following abstract of the study* has been made by Joseph E. Bagdonas, secretary of the Committee on Economics, American Dental Association.

*The study was made by the Institute of Public Affairs at Dalhousie University between 1937 and 1939, with the assistance of grants from the Rockefeller Foundation, and was reported by L. Richter in the May 1944 issue of *The Canadian Journal of Economics and Political Science*.

The two towns in eastern Canada, under study for a period of a year, were Glace Bay, with an 80-year old mutual assistance scheme providing unlimited general medical and hospital care and disability benefits for workers and their families, and Yarmouth, a town with comparable geographic, climatic, economic and ethnic features, with medical care available under the historical private-practice system. The study was undertaken to ascertain the effect of health insurance on the demand for services.

The survey revealed that forty-five persons out of every hundred in Glace Bay received medical care, compared to thirty-four per hundred in Yarmouth. Miners in Glace Bay were studied separately, and were found to suffer almost twice as much illness as other insured wage earners. Families with eight or more persons in Yarmouth received only half the attention of comparable families in Glace Bay. Illness curves by age for the two areas were much the same, but the level of care was generally higher in Glace Bay. Only families of one or two persons received more care in Yarmouth. Thirty-four per cent of the illnesses among wage earners were incapacitating (compelled the person to remain away from work for at least one day) in Glace Bay, as compared with 28 per cent in Yarmouth.

The insured population had 75 per cent more doctors' calls than the group under study in Yarmouth. They also required more than twice as many prescriptions of drugs, and more than four times as many dressings. According to the report, these differences may be explained in part by the higher incidence of accidents among the miners in Glace Bay, and in part by the lack of information on the number of drugs purchased by individuals in Yarmouth who did not obtain services of physicians.

Another difference was the large number of cases in Glace Bay in which medical advice was sought for patients whose complaints were reported to the physician by members of their families. These "complaint" cases exceeded by almost one-half the number of medically attended illnesses, and nearly always resulted in the dispensing of additional drugs.

While specialist service, including that of a dentist, was not provided under the health insurance scheme, some dental service was provided by participating physicians. The report stated:

"Undoubtedly a result of the insurance scheme is the treatment of 504 dental cases with an annual incidence rate of 37.2 per 1,000 population in Glace Bay, while in Yarmouth only forty-one cases with an incidence rate of 5.5 were treated. As the insurance scheme does not provide for dental care, the physician is urged by the patient to do the work of the dentist. If, on the other hand, as in Yarmouth, the patient has to pay the physician a fee for extracting a tooth, he prefers to have the job done by the more experienced dentist."

The conclusions of the research group are quoted verbatim:

"Some of the main findings of the Dalhousie survey as presented in this article may be briefly summarized: 1. Health insurance is likely to bring about a considerable rise in the demand for health services. The rate of increase will to some extent depend upon the previous level of demand in the population. An increase of 55 per cent as found in the survey may be regarded as indicative of the general trend in Eastern Canada if the two communities surveyed are deemed to be representative. The increase might be greater in areas with unfavorable health conditions or among vocational groups which are exposed to special risks. The insured population of Glace Bay, including underground miners, had 75 per cent

more doctors' calls than the uninsured group in Yarmouth. 2. A demand level as indicated by the survey appears to be a permanent feature of health insurance as the insurance scheme surveyed in Glace Bay had been in operation for about eighty years. 3. Health insurance appears to be most beneficial for large families and for children. It is borne out by the survey that under the present-day system of medical care children between 5 and 15 years receive only about one-third of the medical care which children of the same age enjoy under health insurance. 4. There appears to be need for making available to the population under health insurance not only care by the general practitioner but also the services of specialists whenever they seem indicated, according to the state of medical science. Only illnesses which required specialist treatment were found in the survey to have received more medical attention under the present-day system than under insurance. 5. Health insurance seems to bring about an excessive demand for drugs if they are obtainable without cost to the patient. An annual rate of more than three drugs per person in the survey group was found to exist under insurance."

The Committee on Economics suggested the addition of a final point: Exclusion of the dentist from a medical service plan results in a large increase in the amount of service which the physician provides in the oral cavity.

A.D.A. BOARD OF TRUSTEES

A.D.A. BOARD OF TRUSTEES HOLDS ANNUAL MEETING IN CHICAGO FEBRUARY 9-12

The Board of Trustees of the American Dental Association held its annual meeting at the Central Office, Chicago, February 9-12. The cancellation of the Midwinter Meeting of the Chicago Dental Society did not affect the meeting of the Board since the recent federal ruling on conventions does not apply to groups of fifty or less.

Those in attendance at the regular sessions of the Board were the President, Walter H. Scherer; President Elect, Sterling V. Mead, First Vice President, Herbert E. King; General Secretary, Harry B. Pinney; Treasurer, Roscoe H. Volland; the Trustees, David W. McLean, Russell A. Sand, Fred J. Wolfe, Harvey J. Burkhardt, Henry Hicks, Howard E. Summers, H. B. Washburn, Carlos H. Schott, Clyde E. Minges, Edward J. Jennings, C. J. Wright, Harold W. Oppice and LeRoy M. Ennis; Business Manager, John J. Hollister and Editor, Harold Hillenbrand.

The Board did not make a decision on the next annual meeting of the House of Delegates because of the recent federal ruling on conventions and because applications for exemption can not be made in advance of six months before the date of the meeting.

The Board devoted much of its time to matters of routine business and to receiving ad interim reports from various councils, bureaus and committees. A preliminary showing of the new A.D.A. motion picture was also given for the officers and Board members.

A complete account of the meeting of the Board will be published in the March 15 Midmonthly issue of THE JOURNAL.

NAVAL DENTAL CORPS HEARINGS

TESTIMONY BEFORE HOUSE NAVAL AFFAIRS COMMITTEE ON BILL TO IMPROVE EFFICIENCY OF DENTAL CORPS

With this issue, THE JOURNAL begins the serial publication of the testimony presented before the Committee on Naval Affairs of the House of Representatives on the bill (H. R. 4216) to provide more efficient dental care for the personnel of the United States Navy. The bill was reported favorably by the committee and was passed by the House of Representatives December 12.

Hearings were held on the companion bill (S. 2144) by the Senate Committee on Naval Affairs, but the bill was not reported before the adjournment of the 78th Congress.

It is understood that the Committee on Legislation of the American Dental Association is preparing a similar bill for introduction into the new Congress.

HOUSE COMMITTEE. — Members of the House Committee on Naval Affairs for the 78th Congress were:

Carl Vinson, Georgia, Chairman; Patrick W. Drewry, Virginia; Warren G. Magnuson, Washington; Lyndon B. Johnson, Texas; Michael J. Bradley, Pennsylvania; Beverly M. Vincent, Kentucky; Ed V. Izac, California; Lansdale G. Sasscer, Maryland; James J. Heffernan, New York; L. Mendel Rivers, South Carolina; F. Edward Hébert, Louisiana; John E. Fogarty, Rhode Island; Winder R. Harris, Virginia; Cameron Morrison, North Carolina; Emory H. Price, Florida; William A. Rowan, Illinois; Anthony J. Dimond, Alaska; Bolivar Pagan, Puerto Rico; Melvin J. Maas, Minnesota; James W. Mott, Oregon; W. Sterling Cole, New York; George J. Bates, Massachusetts; William E. Hess, Ohio; John Z. Anderson, California; James Wolfenden, Pennsylvania; William W. Blackney, Michigan; Ward Johnson, California; Robert A. Grant, Indiana; Margaret Chase Smith, Maine; James V. Heidinger, Illinois; John D. McWilliams, Connecticut, and Joseph R. Farrington, Hawaii.

The major portion of the testimony given before the House Committee follows:

HOUSE OF REPRESENTATIVES,
COMMITTEE ON NAVAL AFFAIRS,
Thursday, June 1, 1944

The committee met, at 10 a.m., Hon. Carl Vinson, chairman, presiding, for consideration of H.R. 4216.

The CHAIRMAN. Now, members of the committee, we call up H. R. 4216, a bill to provide more efficient dental care for the personnel of the United States Navy.

Let the bill be printed in the record and let the report also be printed in the record.

(H. R. 4216, together with the report thereon, is as follows:)

[H. R. 4216, 78th Cong., 2d sess.]

A BILL To provide more efficient dental care for the personnel of the United States Navy.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that (1) the Secretary of the Navy be authorized and directed, no later than sixty days after this act becomes law, to establish a Dental department in the Navy, which shall function under the Surgeon General as is now provided in the case of the Medical Department.

(2) To provide that the functions of the Dental Department shall be of such professional, technical and administrative nature as to pertain to the conduct of the naval dental service, including cooperation with the Medical Department in all matters of mutual interest and cognizance.

(3) To provide that personnel of the Dental Department shall consist of (a) officers of the Dental Corps, one of whom shall serve as Director of Dentistry and be directly responsible to the Surgeon General for the administration of dental affairs within the Bureau of Medicine and Surgery; (b) chief warrant and warrant officers in numbers not exceeding 5 per centum of the total number of officers of the Dental Corps; (c) enlisted personnel in such ratings and distribution by pay grades within the ratings and in such numbers not to exceed 166 per centum of the total number of dental officers, as may be prescribed by the Secretary of the Navy: *Provided further,* that nothing stated herein shall act to reduce the grade or rank of any person.

(4) To provide that the Director of Dentistry shall be appointed by the President from dental officers on active duty and that the Director of Dentistry shall, while so serving, have the rank of Rear Admiral.

(5) This act to take effect immediately upon its approval by the President.

NAVY DEPARTMENT,
Washington, April 13, 1944.

Hon. CARL VINSON,
Chairman of the Committee on Naval Affairs, House of Representatives.

MY DEAR MR. CHAIRMAN: The bill (H. R. 4216) to provide more efficient dental care for the personnel of the United States Navy, was referred by your committee to the Navy Department with request for report thereon.

The purpose of the bill is to direct the Secretary of the Navy to establish a dental department of the Navy which, while functioning under the Surgeon General, would be separate, both as to personnel and matériel matters, from the Medical Department and would be headed by a director of dentistry, appointed by the President from dental officers on active duty, and who while so serving would have the rank of rear admiral.

It is the opinion of the Navy Department that enactment of the bill would result in no improvement of the service of the Dental Corps to the Navy. The Dental Corps should be an integral part of the health organization of the Navy and as such should function as a division of the Medical Department. To establish the Dental Corps as a separate department would call for a complete duplication of the matériel organization and would require building up a separate section of the Hospital Corps, whose members would operate in a very narrow and limited field. The Dental Corps is functioning efficiently as an adjunct of the Medical Department and it is felt that nothing is to be gained by changing its relationship at this time.

Dentistry is much more than a mechanical process, and a good dental officer should know more than just how to repair a dental defect. He should have a very thorough understanding of body metabolism, physiology and pathology; otherwise, he will overlook many conditions that are caused by disease processes in other parts of the body. It would be just as logical to set up separate departments of the Navy for brain surgeons or plastic surgeons, for they are also highly specialized sections of the medical profession.

If dentistry is to continue to be a part of the health organization of the Navy, it must continue to function in the naval hospitals. When so functioning, dental officers should be under the cognizance of the medical officer in command, as are all other officers engaged in their specialties.

The enactment of the bill would affect seriously the situation of dental officers serving aboard ship. Dental officers at present form an integral part of the medical department of a ship and a part of its battle organization. To separate the dental officer from the medical organization would place him in a unique position and would greatly limit his usefulness.

It has been the policy of the Navy Department to add to the professional qualifications of dental officers by giving them postgraduate instruction in plastic surgery of the face, advanced instruction in pathology and postgraduate study in all forms of anesthesia and advanced first aid. This has contributed to the usefulness of dental officers in battle organization.

Dental officers now have the same opportunities for advancement and promotion as other staff corps officers, except that the number authorized to hold flag rank is more limited. It is considered that flag ranks for staff corps officers are justified only when flag billets are available. If a number of flag officers are performing duties that junior officers could perform, harm is done to the organization and justifiable criticism can be expected.

At the present time, the only rear admiral of the Dental Corps on active duty is assigned to duty as inspector of dental activities and is responsible to the Surgeon General of the Navy. He supervises and inspects the reports and activities of district dental officers, thereby keeping the Chief of the Bureau of Medicine and Surgery advised at all times as to the needs of the Dental Corps.

In all military organizations, there must be responsible heads of divisions and sections. This principle has been adhered to in the Medical Department organization and medical officers, dental officers, officers and enlisted men of the Hospital Corps, and members of the Nurse Corps, function as an integrated military and professional unit under the direction of the medical officer in command, or senior medical officer. This organization has functioned well in the past and is satisfactorily meeting the needs of the Navy during the war emergency.

In view of the above, the Navy Department recommends against enactment of the bill H. R. 4216.

The Navy Department has been advised by the Bureau of the Budget that there would be no objection to the submission of this recommendation.

Sincerely yours,
FRANK KNOX.

The CHAIRMAN. Now, members of the committee, it is usually customary for the author of a bill to be given the opportunity to present his views. The bill was introduced by our distinguished colleague, Mr. Rivers, of South Carolina, and I will ask Mr. Rivers to make any statement he desires to make.

Mr. RIVERS. I want to thank the chairman for this opportunity this morning to get a hearing on this bill which I introduced some months ago.

I want to state, Mr. Chairman, that this bill was introduced at the instance of and at the request of the American Dental Association. A number of dentists have, for a long time, urged me to introduce some sort of legislation, and after consultation with them this bill emanated as the best judgment of the profession.

It is designed to promote the efficiency of and improve the entire morale of the dentists in the Navy. This bill is the result of two lines of thought in the profession. One line of thought is more radical than this, to completely divorce dentistry from the Surgeon General of the Navy. With that, I am not in accord at this time. The other and more conservative members of the profession would prefer to remain under the Surgeon General as separate and apart, however, from the medical profession, as now exists in the Navy Department, with respect to all dentistry.

It is my opinion, and this bill is very simple, that this bill will promote efficiency. It will let the dentists of the Navy have a separate department under the Surgeon General of the Navy to handle only things dental. It will not permit the medical members of the Navy to dictate, as they are now accustomed to, I am informed, the policy of dentistry, which, naturally, as everybody else, they have nothing to do with, or should not have anything to do with. In civilian life, dentists and members of the medical profession are separate and distinct. Dentists do not dip into the medical profession, and doctors do not dip into the dental profession.

They feel, in the interests of greater efficiency, and improvement of the morale and the whole development of the Navy with respect to dentistry, that this bill will be a long step in promoting something that is inevitably coming, as sure as the sun shines, and it will be a step which will improve the entire set-up under the Surgeon General.

We will not be apart from the Surgeon General. He will still be head of the whole Department of Dentistry, but, by the provisions of this bill, he will be required to leave dental things to members of the dental profession, and to leave medical things to the medical profession, and that is all we ask.

We regret that the Navy is opposed to this bill, but I am certain that, after I have presented my witnesses, you will agree with us, and I have witnesses here from the entire profession. We have here the President of the American Dental Association and a number of other representatives whose names I would like to read at the proper time, and I would be glad to answer any questions any of the members of the committee would like to ask. . . .

At this point, Congressman Rivers introduced the various witnesses who were to appear for the bill and also inserted various documents into the record.

SUMMARY OF ARGUMENTS PERTAINING TO H. R. 4216 AND S. 1861

When the Navy Dental Corps was created by act of Congress in 1912, there were only thirty dentists in the Corps. For this reason and because there were so few officers indoctrinated in Navy routine, it was thought advisable by Congress to provide that "the Navy Dental Corps shall be a part of the Medical Department." Because of this provision, commanding officers or other agencies may not regard the dental departments (so-called) on ships or stations as separate departments, although they frequently speak of them as such and regard them as such so far as possible.

In spite of the fact that the Dental Corps now has on active duty more than 5,000 dental officers, it is still under the control of medical officers to such an extent that the present Dental Corps cannot make a decision or represent the dental service professionally or administratively directly to a commanding officer; nor has it any control over its own supplies, equipment, or personnel. In fact, in some instances, medical officers have gone so far as to issue orders requiring medical supervision in the practice of the dental profession.

Medical officers have interfered with the Dental Corps, their assistants, their supplies and equipment; have issued directives dealing with dental matters without consultation with the dental officers involved; have ignored and refused the suggestions and advice of the officers of the Dental Corps; all with the result that the efficiency of the Dental Corps has been greatly impaired. The proper method to correct this condition is to create a separate dental department under the Surgeon General and cooperating with the Medical Department so that there is established a relationship similar to that existing in civilian practice.

The objection to the enactment of this bill as set forth by the Navy Department contains many misstatements of fact and its conclusions are illogical and unreasonable. The objections are answered in detail in the comment herewith. Further, a Dental Department within the Bureau of Medicine and Surgery would in no way impede or change, to any appreciable extent, the present organization and purpose of the Bureau of Medicine and Surgery. It would, however, guarantee a more efficient administration and understanding of dental problems by placing the responsibility in the hands of those most competent to assume it.

The claim is made by the Medical Department of the Navy that dentistry is a part of medical practice. Dentistry is a definite part of health service, but not medical service. If the statement is accepted that dentistry is a part of medicine, then it would be equally true that a dental officer should have all of the rights and privileges of a medical officer, which the dentist does not want; but the dental officer does not have these privileges. In the Navy, a dental officer can never become the head of the Medical Department of a ship or station, although he is a part of that Medical Department. Dentistry has always had its own predental training, its own dental schools, separate and distinct from those of medicine, its own

state boards, state laws, and its own private and individual practices; although there has been a very splendid ccoperation with medicine in all civil practices.

There is no difference between predental and premedical education today. Both the Army and the Navy in the Army specialized training program and V-12 programs require the identical preprofessional training for both students contemplating the study of medicine and dentistry. The medical and dental training in professional schools is exactly the same number of hours and years. The dental student is trained in the same basic science courses as is the medical student; namely, anatomy, histology, physiology, pathology, bacteriology, etc. Following graduation from professional schools, some states require that a medical graduate pursue a one-year course of internship. The state laws in the majority of states do not require this. Dental internship is recognized, but only required in one state for licensure, namely, the State of Delaware. There are approximately 300 hospitals in the United States which give a dental internship of one year to the recent graduate.

In a department where any one person is invested with authority, the claim is then made that dentistry is a part of medicine, which cannot be substantiated by any facts anywhere.

On December 17, 1942, Congress granted to the Dental Corps the status of rear admiral. Representatives of the Bureau of Medicine and Surgery and of the Bureau of Personnel appeared in both Houses of Congress to oppose this bill, stating that it would not be to the best interest of the Department. The opposition was based on the assumption that if a rear admiral were appointed in the Dental Corps, he would go into the Bureau of Medicine and Surgery as head of the dental activity in that bureau. After hearing the facts in the matter, Congress decided against the Navy Department and gave this status to the Dental Corps, but the Bureau of Medicine and Surgery did not carry out the intention of Congress.

The Dental Corps is not seeking complete separation from the Bureau of Medicine and Surgery, but does wish to have the right to administer purely dental affairs. This is the same plan that has been adopted in the British Navy and has proved highly successful. It is not the complete separation that has been effected in the armed forces of Canada. Dentistry is asking for the same freedom from outside control that medicine demands and insists upon for itself. This legislation is requested because the dental profession believes that it will be to the advantage of all concerned.

This bill will bring about a better relationship and cooperation and will establish a more efficient dental service. It is in the interest of the Medical Department, the Dental Department and the entire personnel of the Navy.

LIST OF COMPLAINTS

Medical officers approve leaves for personnel at times that interfere with the orderly conduct of dental operations.

Medical officers act on emergency leaves with similar result.

Medical officers take disciplinary action in minor infractions or fail to take action when needed.

Medical officers determine advancements in rates as jurisdiction over the barracks housing our technicians.

Medical officers make fitness reports on dental personnel without consulting or obtaining any information from the Dental Corps.

Medical officers select students for dental technician schools.

Dental Corps personnel, in order to secure advancement to first class and chief ratings, are compelled to take written examinations that contain only medical questions and no dental questions, and their papers are graded by medical hospital officers, even though the Dental Corps personnel are seeking advancement in Dental Corps ratings. The result is that Dental Corps personnel are placed at a great disadvantage, are intentionally discriminated against, are discouraged from seeking advancement, and have their morale lowered.

As matters now stand the dental officer must limit his activity in the establishment, organization and control of his particular department to the customs, policies, and decisions of the Medical Department.

The present system of mixed corpsmen's duties is not conducive to maximum efficiency. Even in large stations, the dental watch lists and key positions in the dental clinic are adversely affected by the inclusion in the medical duty lists, supernumerary calls, etc., of dental corpsmen whose schedules have been arranged by the dental officer according to his roster and whose presence he should be able to rely upon.

The need for and the actual requisitioning of dental materials should be left to the dental officer. He is in a position to know the specific requirements of his department. Often materials are ordered or left unordered because of certain allowances, estimates, etc., which work well on paper, but do not reflect the actual needs of a particular function or part of the dental clinic. Where two or more agencies are dependent upon a single allotment for supplies, there is always the possibility of discrimination.

Legislation should be enacted which will place the Dental Corps on an equal footing with other staff corps of the Navy and permit of a more efficient organization by reason of control in the hands of those who are

thoroughly cognizant of its requirements and its particular problems.

There are many instances where dental officers were required to move from a ship or station because of a new medical officer who was junior in rank to the dental officer.

Frequently the dental officers have had more Navy experience than the medical officers who make the decisions. For example, there may be ten dentists at a station who will have ten corpsmen assisting them in the making of artificial sets of teeth, mixing filling materials, or assisting in a difficult extraction of a tooth. While they are in the midst of their dental work, the dental [medical] officer may call these corpsmen to participate in a lecture. These corpsmen are then duty bound to leave their dental work despite the protest of the dental officer, thereby interfering with the efficient completion of the dental operations and the comfort of the patient.

Example: Instance of a case where a dental officer reported for duty and was assigned a ship. Automatically, under Navy regulations, the medical officer is senior to the dental officer. Later, owing to circumstances, three men on board that ship had to have emergency dental treatment, which could not be rendered by the dental officer at the time it was needed. As a result, the dental officer set these three men ashore where they could obtain the proper dental treatment. After the medical officer found out that the dental officer had sent these men ashore, the medical officer told the dental officer that the dental officer had no authority to send the men ashore and that they should have cleared through the medical officer.

Medical officers have recommended and secured the promotion of dental officers considered unsatisfactory and unqualified by the senior dental officer.

Medical officers have failed or refused to order supplies considered necessary by the senior dental officer.

Medical officers have refused to permit the use of available funds for repair of dental equipment when such funds were being used for repair of medical equipment even though such funds were allotted for the repair of both. The same thing has been true of the procurement of supplies.

Medical officers have prepared dental budgets without consultation with the senior dental officer.

Medical officers have refused to supply commonly used drugs to the dental clinic. This applied not only to drugs administered internally but locally.

Medical officers have refused to permit dental officers to use nitrous oxide and oxygen, regardless of experience.

Frequently where funds are appropriated for medical and dental purposes, they are used almost exclusively for medical purposes. . . .

STATEMENT OF DR. STERLING V. MEAD, HEAD OF LEGISLATIVE DEPARTMENT, AMERICAN DENTAL ASSOCIATION, WASHINGTON, D. C.

The CHAIRMAN. Dr. Mead.

Dr. MEAD. Yes, sir.

The CHAIRMAN. Dr. Mead, give the reporter your full name and the position you occupy in the Dental Association, and what your official connection with the association is.

Dr. MEAD. Dr. Sterling V. Mead. I am located in Washington in private practice, and I represent the American Dental Association of 70,000 dentists. I have been instrumental in the introduction of this bill by reason of authority of the House of Delegates and the Board of Trustees of the American Dental Association.

I do not have the desire to try to consume a great deal of your time because I am sure all of you are familiar with most of the aspects of this bill. I will simply try to summarize some of the important features of it.

The Dental Corps in the Navy was established in 1912 as a separate corps, absolutely separate and distinct from the Medical Department Corps, but was placed under the Medical Department because there were only thirty dentists in the corps. That corps has now grown so that there are over 5,000 dental officers in the Navy Dental Corps. That is more than the combined number of medical and dental officers during the last war. It is more than the combined officer strength of the Navy in 1939.

The bill was introduced and urged by the American Dental Association because the men in the Navy cannot speak for themselves. They cannot appear before hearings. They cannot represent themselves. They have to be represented by men who have their interests at heart.

You might say, or some people might say, "We welcome suggestions from these men," but there are not any of them who would be willing to come here and jeopardize their position by speaking out of turn. I suppose they do not hang any of them, but they may be sent to almost any place if they get into bad standing.

On the other hand, the opponents of this bill, medicine, can be represented here by their highest authorities, and there is somewhat of a disparity between the opportunity for argument at this hearing.

The dentists in the Navy for many years have been very dissatisfied and feel that they can increase their efficiency by what we suggest here in this bill. They are becoming more dissatisfied all the time, and they feel that they have a case that should have your careful consideration.

Who opposes this bill? When a bill is introduced in Congress, it goes to the Navy Department for consideration and report thereon. A report has been made, a negative report has been made by the Department,

which is the report of the Medical Department. Now, I have not seen any report from the Dental Department. Surely the dentists have something to say about a matter that affects their own corps, but I doubt whether any of you have been shown anything from the Dental Department. At least, I have not seen anything from the Dental Department. Surely, there must be some report from them, but I have not seen any report.

So the Medical Department are the ones who are opposed to this bill.

Who is to be satisfied—the Dental Department or the Medical Department, or the personnel in the Navy? The ones who should be most concerned are those men who will receive the treatment, and if dental treatment would be affected by a separate dental department or bettered by having a separate department than under the jurisdiction of the Medical Department, then it should receive careful consideration.

They say, "Well, this cannot be accomplished to advantage," but you already have in the Navy what we are asking for in this bill, at the Naval Medical Center at Bethesda. Dentistry was given a separate department at that station. There at that station is a center of medicine, of dentistry and of hospitalization all under the Medical Center, with a Medical Corps officer as the commanding officer. Now, dentistry does not object to serving under the commanding officer, even though he be a medical officer. They want to go direct with their problems to the commanding officer, whoever he may be, whether he be a line officer, a medical officer or an engineer officer, or whoever is in charge of the ship station or hospital wherever they are located. There is such a set-up out at Bethesda. There is the most efficient part of the Navy Department's dental service in that set-up because they can order what supplies they want, and they can make recommendations that can be heard. They have something to do with the personnel and efficiency ratings, and all of those things, the lack of which is complained about now. If you will give to the other departments of the Navy what you are giving to the dentists at Bethesda, then you will have a better dental service.

The dentists are not satisfied with the service they are giving at the present time, but they are giving a very good account of themselves because of the fact that you have 5,000 of the best dentists in the United States in this Navy dental service who have been brought in there in order to improve mouths, which is a very important part of the health service, not necessarily a part of medicine, but health service.

The inference is brought out that dentistry is a part of medicine. In civil practice, we all know that dentistry has always had its own schools, separate institutions absolutely, and its own state laws, its own regulations, its own examining boards and its own literature, and absolutely separate and distinct.

If you want something done to your mouth, you do not go to a physician, but you go to a dentist. In private practice, I can write you any prescription I want to. In the Navy, a dentist can only write a prescription if it is signed by his superior medical officer. I can write a prescription for you, I can give you any type of anesthesia I desire, but you cannot do that in the Navy.

Medicine has been very kind and very good to a young profession in civil practice, and we get along well with medicine to the advantage of the public. Dentists do not belong to their societies, and they do not belong to ours, and we do not want to be physicians, and they do not want to be dentists.

I have a resolution I want to introduce from the Minnesota State Medical Association approving this bill, because there is separation between medicine and dentistry. When you get into these services these physicians tell you dentistry is a part of medicine, and it should have the right to command the department in which it is most interested, but they have not that right. You cannot have them a part of medicine unless you are willing to give them those rights. They say dentists have the same opportunities for advancement. They do up to a certain point, but they do not have the opportunities to be heads of departments.

The efficiency of the Navy Dental Corps is all that could be asked under the circumstances, but the Dental Department is made responsible, for the dentistry in the mouths of these young men, but while they are made responsible, their rights are taken away from them. They are made subordinate to the medical officer above them, even though the dental officer may outrank him.

So, you cannot give somebody responsibility and then take away authority from him and then have the same efficiency in the Dental Corps.

All of the 5,000 men who are now in the Dental Corps of the Navy are coming out one of these days, and they will be even more bitter than they are now because they are all dissatisfied with the arrangement they now have in the Navy service.

In the Army, there is a dental division which has a director of dentistry in charge, who is directly under the Surgeon General. It is a little different set-up than in the Navy, but from there on down, both set-ups are alike.

This bill is not going to effect any unreasonable or unworkable changes. There will not be any more officers put into the service, except by the authority of the Surgeon General. There will not be any changes or they will not be promoted, excepting in this control—it makes no change in dental officers at all in the Navy. There is no increased cost on that account.

They even have in the Navy at the present time rear admirals who could be appointed to the position named if they wanted to do so. That is a matter up to the Surgeon General's direction. Now, on the rights, I want to just take your time to read one sheet which you have in your record:

As head of the Dental Department, the commanding dental officer would have cognizance, now denied him, as follows:

(a) He would be directly responsible to the commanding officer for the administration of the dental service under his command. This is now denied him.

(b) He would participate in heads of departments conferences called by the commanding officer or the executive officer where he could present the dental situation clearly and concisely in the presence of other heads of departments and thereby develop a better understanding and cooperation. This is now denied him.

(c) He could contact the commanding officer directly with any dental problem which might arise, thereby presenting his case as he sees it to an officer trained and capable in administration with a broad point of view concerning the comfort, welfare and efficiency of his personnel. This is now denied him.

(d) He would recommend directly to the commanding officer or the executive officer concerning improvements and requirements of the dental clinics and other spaces assigned to the dental activity. This is now denied him.

(e) He would submit requisitions for dental equipment and supplies and be responsible for all property accounting, maintenance and care of dental property. He would determine the amounts of supplies required and maintain a proper balance for economical and efficient function. This is now denied him.

(f) He would exercise his own judgment in establishing the ways and means of distributing dental treatment to the end that the greatest number may be served and that established professional standards may be maintained. He will have complete supervision over the professional conduct of his personnel. This is now denied him.

(g) He will have complete control of all personnel assigned to the dental department which will permit him to utilize such personnel to the best advantage without fear of interruption from other services. Leave and liberty, watches, recommendations for promotion and punishment for minor offenses among dental personnel will be handled by the senior dental officer as station requirements permit and as performance warrants. This is now denied him.

Mr. COLE. Are you quoting somebody there?

Dr. MEAD. No.

There are a number of training centers all over the United States, and at those training centers dentists outnumber the physicians 2 to 1, 4 to 1, and in some instances even more than that number, and in spite of the great superiority in numbers of dental officers at these training centers they are not in command of their own dental officers. They are under the command of a medical officer, and in some instances that medical officer is outranked by the dental officer, but the dental officer has to take his orders through that medical officer. That is one of the chief complaints of this bill.

Last year, we appeared before your Congress and asked for the rank of rear admiral, which had been under consideration for a number of years. The Navy appeared at this hearing and gave very flimsy excuses. The first flimsy excuse was that the bill would not be in the interests of the Department because of the fact that they had serving as Assistant Surgeon General a captain, and it would not be practical to have a rear admiral in dentistry in the Bureau of Medicine and Surgery, and they did not pay any attention to the fact that there were already two medical officers who are rear admirals, but they worried about a dentist being a rear admiral. I can present it to you in their very words. They gave you the impression, and you had the impression when you gave that rear admiral to us above their objections, that he would go to the Bureau of Medicine and Surgery. He did not go there, and we were told he would go there. He has never gotten there, and they did not want him there. He was made inspector of dental material.

When we made a fuss about that, we were told that he was simply getting the lay of the land, and then he was appointed chief dental inspector. Now, you cannot have one dental inspector to take care of the needs of the Navy, and you do not have any rear admirals in dentistry in the Southwest Pacific.

These men who are doing the work under adverse conditions are the ones who need improvement, and not at Bethesda, and places where they have ideal set-ups.

There is an implication from the Department that dentistry does not have the same education that you have in medicine. The Army and the Navy set up their own program for professional education for the dentists and physicians.

That program was set up exactly alike, and both premedical and predental courses are based on two foundation years, with the same studies, chemistry, organic and inorganic chemistry, and physics, and exactly the same number of hours with the same standards exactly, and a man who passes that course could go into either medicine or dentistry with that foundation. Inferences were given that dental men need pathology and bacteriology, and so forth. I wonder if that inference is given to indicate that they do not have that training.

I think we will have something to say about that because the dentist has two years of exactly the same type of training that a

physican takes, and do not let anybody think they do not come out of schools with the same qualifications that a physician comes out of school with.

Mr. COLE. You do not mean that a graduate dentist could perform the same kind of work that a graduate of a medical school performs?

Dr. MEAD. As far as dentistry is concerned, I say a dentist is in a position to take care of a dental problem in the same way a physician is in a position to take care of medical problems.

What is it that a physician knows about dentistry when he goes through medical school that entitles him to supervise the dental service? A dentist does not undertake to supervise medical work, and they do not want somebody else to control them regarding something they are not trained in, and in which the dentist is trained.

Mr. IZAC. How many years is the course?

Dr. MEAD. It is four years for both medicine and dentistry, and two years premedical and two years predental.

The CHAIRMAN. Let us let the doctor finish his statement and then ask the questions.

DR. MEAD. As to morale, there is not anything as important to efficiency in an organization as morale. Do you think that the dentist can have morale when he cannot have the respect of the enlisted personnel who work for him as technicians, and when he has no authority? You can give him rank, but without any authority he does not have any morale.

Congress appropriates money, and a certain amount of it is earmarked for dentistry. Does it go to dentistry? It may go to dentistry if the Medical Department does not have need for all of it.

The Dental Department should have something to say in the distribution of funds that are earmarked for this service.

You may say that the Dental Department is consulted with reference to it. That is true, they may be consulted, but it does not do any good to consult a person if you do not carry out any of his ideas. They probably were consulted about this bill which is now before you, but we have not been told what they said about it, so what good does it do to consult them if nothing is brought up as the result of it?

I will cite one case, in particular, that I think should be very interesting to you. Fairly recently, a carrier was put into service, and one of our outstanding Dental Reserve men with the rank of commander was put on that ship, and he was an outstanding dentist. He did excellent work, and took good account of himself. He had been in the previous war and under fire, and he loved getting into the combat areas. His whole ambition was to go with this ship and serve. He went out on the trial cruise, and he came back, and he was detached from it. He was detached because of the fact that the medical officer on board found that the dental officer outranked him. So, therefore, he asked for his release, and that is not uncommon because the medical officer always has to outrank the dental officer when they demand it. It is not efficient when a thing of that kind is done. I can give you the facts, and I can tell you the case.

No matter what experience a dental officer has had, he is kicked around to conform to the rank of the medical officer. Medicine, therefore, is vulnerable when it comes to dentistry in this case.

We have access to all of the men. We have access to what they are thinking or doing. There are many men in the Navy who feel that the only solution of this matter is a complete separation, having a corps of their own, a surgeon general of their own, and that is what Canada has, but England has had in effect since 1925 exactly what we are asking for here.

Unless there is cooperation on the part of the Medical Department through a plan that will bring about this cooperation and a change, this sentiment will grow for a complete separation of the corps.

I am wholeheartedly for the plan proposed here. The leaders in dentistry are very much for this bill, and I, for one, if we do not get cooperation from medicine, will go over to the group who want a surgeon general of their own. If we cannot get cooperation we had better take it another way.

I want to call your attention to the objections of the Medical Department to this bill. I want to call your attention to the comments of dental officers about this. I think you will find those excuses of the Medical Department are very flimsy when you see the replies that have been made, and the list of complaints that have been given to me about the various things in connection with the service.

I think I have consumed more time than I should, and I would be glad to have the chairman, or Congressman Rivers, introduce the men who are appearing here as witnesses.

The CHAIRMAN. If you have finished your statement the committee probably has some questions to ask you.

Dr. MEAD. Yes, I have finished my statement, Mr. Chairman.

The CHAIRMAN. Mr. Rivers, do you have any questions?

Mr. RIVERS. No, I have no questions at this time.

The CHAIRMAN. Doctor, there are a few questions I would like to ask for the record. You are legislative counsel or representative for the American Dental Association?

Dr. MEAD. That is right.

The CHAIRMAN. How are you elected?

Dr. MEAD. I am elected by my district. Each district has a trustee. Each certain

number of states, usually from five to seven states, have a trustee, and those trustees meet for each district. A man has to be elected to the legislative committee. I was elected to the legislative committee, and the board of trustees met and elected a member of that committee chairman. I was elected chairman by the board of trustees who represent these districts. I was elected from this district to the legislative committee. I am an elected officer.

The CHAIRMAN. There are some 70,000 dentists who belong to the American Dental Association.

Dr. MEAD. That is right.

The CHAIRMAN. At your annual meetings you have state organizations and then growing out of your state organizations they have some one to represent them in Washington City on legislative matters?

Dr. MEAD. That is right.

The CHAIRMAN. And you occupy that position?

Dr. MEAD. I do not receive any salary, Mr. Chairman, and I spend considerable of my time in the promotion of the interests of dentistry.

The CHAIRMAN. You advise the dentists throughout the country, through your state organizations, and through the mailing list of 70,000 as to medical legislation pending in Congress?

Dr. MEAD. Partly, Mr. Chairman; that is only part of my duties. We have other committees interested in that to take care of that.

The CHAIRMAN. How do you propagandize Congress when legislation is before Congress relating to dentists?

Dr. MEAD. We try to tell them the truth.

The CHAIRMAN. And what method is that?

Dr. MEAD. In any way we can—by personal contact, or by any avenue we have, to give them the information they should have.

The CHAIRMAN. Now one of your missions is to acquaint the dental associations throughout the country with legislation that is pending, or of legislation which you think is of interest to the dentists?

Dr. MEAD. No, sir; I do not suggest legislation.

The CHAIRMAN. I understand.

Dr. MEAD. The legislation is suggested to me.

The CHAIRMAN. That is right.

Dr. MEAD. The American Dental Association tells me what they want done.

The CHAIRMAN. That is right. And then, when they tell you what they want done and it is before Congress, you begin to acquaint the members of the association with the legislation?

Dr. MEAD. Yes, sir.

The CHAIRMAN. And advise the members of the association that "this sort of legislation is pending before Congress" and suggest to them, then, that they begin to advise their Representatives of their views?

Dr. MEAD. Yes, sir.

The CHAIRMAN. That is the way it is done?

Dr. MEAD. Yes, sir.

The CHAIRMAN. Now has this bill which is pending been freely circularized throughout the profession and with the Navy Department comments on it, or just from your viewpoint?

Dr. MEAD. It has been freely circularized. Not only that, but we have an element in our organization, and I think they will be presented to you—we have nonofficial representatives who are far more anxious to have a more drastic change than what the leaders of dentistry would like to see.

The CHAIRMAN. That is right. Now, judging from your statement, as I caught it, if you cannot get it this way, why you want it another way which is more drastic?

Dr. MEAD. Mr. Chairman, I do not want it any way but this way. I think the leaders of dentistry want it this way. But if the Medical Department does not cooperate with the thing which we think is good for them and good for dentistry and Navy personnel, they are going to drive the dentists into a plan that has been accepted in Canada, which is a more drastic plan.

The CHAIRMAN. When you circularize or notify all of the dentists either directly or through your association, of legislation which is pending, do you also give them the viewpoint of the Navy Department, or the War Department, or do you merely give them the picture of it from the dental viewpoint?

Dr. MEAD. Each one of you has on your desk exactly what has been circularized and sent to every dentist in the United States. He has the reply of the Department; he has the comments on that reply, and that is the information you have.

The CHAIRMAN. He has the reply from the Department?

Dr. MEAD. Absolutely.

Mr. RIVERS. The Navy Department has not circularized the dental profession on what the dentists in the Navy think about this bill, you see.

The CHAIRMAN. I understand.

Mr. RIVERS. The Navy's comment on this bill is from the medical profession.

The CHAIRMAN. The Navy Department knows the Dental Association is advocating the bill; therefore, it is not necessary for them to advise them of that of which they already have knowledge.

So the profession has been notified as to the comments and the views of the Navy Department?

Dr. MEAD. That is right, sir.

The CHAIRMAN. You sent out to all of your 70,000 men and women the sum and substance of the Navy's contention in regard to the bill?

Dr. MEAD. May I answer that in this way, also: I should like to present for the record an editorial in the *Macon (Ga.)*

Journal and also in the *Buffalo News*, concerning this bill. I also have other editorials that have appeared in our official magazine that goes to each and every dentist, which bring out all the phases of this matter.

The CHAIRMAN. I am aware of the activity that has been going on in Georgia, and am also aware of some of the activity that has been going on in the State of Minnesota.

Mr. MAAS. I am very proud of my own state, in this case.

Mr. RIVERS. Let me remind the chairman that the right of peaceful petition is something that we still have in the Constitution.

The CHAIRMAN. Exactly. Nobody is complaining about that; but I am examining the witness along my own line.

Now, has the same activity that has been carried on in Minnesota and in Georgia been carried on in the twenty-three other states represented by the various members on this committee?

Dr. MEAD. Yes. Every state has been notified of the merits of this bill, and as to both sides of the controversy, and every state has the information.

The CHAIRMAN. Now, may I ask you to point out how this bill will improve the service of dentistry in the Navy? How will the establishment of a separate organization, the Dental Department, improve the present service?

Dr. MEAD. Mr. Chairman, I thought many of those things were self-evident from what I said. Let me reiterate one or two of the important things. Morale is of great importance—

The CHAIRMAN. Now show the committee how the morale has broken down in the set-up as it exists today.

Dr. MEAD. We have personnel in the Navy who are taken into training schools for dental technicians. We have training stations all over the United States, and at those training stations there are schools for the education and training of technicians to help the dentists. There is no rating or qualification for those technicians; they are all taken in as pharmacist's mates. They are grouped in under the Medical Department, and the Medical Department can move them at will; they can direct a man to move although he is very busy on some dental assignment; they can take a man and put him on watch, and transfer him to some other ship. And there are a few instances where technicians with no knowledge of medicine are put in dispensaries handling drugs when they know nothing about drugs. The Dental Department has absolutely no control over its own personnel, except to request where they be sent. When they ask for personnel in the Navy to be sent to the training stations for training, they do not know who is going to be sent; they have nothing to do with the qualifications, cannot pick the qualifications, can do nothing except to ask the Medical Department to send them; but they always look around and, if they see men mowing the lawn of the medical officer, they always think those are the ones who will be sent, because the Medical Department does not need them.

The CHAIRMAN. I do not think you answered my question. It may be sufficient, but I do not think you have yet stated how the morale of the service will be increased by having a separate department.

Dr. MEAD. I will answer that directly.

The CHAIRMAN. Of course, you have a separate corps now.

Dr. MEAD. Let us put it this way: Supposing you were a dentist and you were trained in dentistry, and you felt you were as good in dentistry as a medical man is in medicine, and you were put in charge at the station and have a number of dentists serving under you and have the responsibility for the smooth running of that branch and you need some supplies: You cannot order supplies; you have to go to the medical officer directly over you; you cannot go to the commander of the station. Supposing we did not have a medical department at Bethesda and you were a dentist there and needed supplies: You could not go to the commanding officer of that center; you would have to go to the medical officer directly above you. If he sees fit to approve a requisition for those supplies, all right; but if he says "You do not need these," you are not in a position to get them.

The CHAIRMAN. Does not that also follow in every naval district, that you have to make your purchases and requisitions through the commanding officer?

Dr. MEAD. That is right, but the Dental Corps is not making requisitions through the commanding officer.

The CHAIRMAN. You know the Bureau of Medicine and Surgery is made up of four different, separate units. Is not that correct?

Dr. MEAD. That is correct.

The CHAIRMAN. The Dental Corps, the Medical Corps, the Navy Nurse Corps and the Hospital Corps. What you are asking in this bill is that the Dental Corps be set aside and be not under the Medical Corps.

Mr. MAAS. No.

The CHAIRMAN. Is not that it?

Dr. MEAD. Not necessarily, Mr. Chairman. You have the wrong conception. We are asking that the same accord be given to the dentists as is given to the Medical Corps.

The CHAIRMAN. But you are asking that you be permitted to operate the Dental Corps under a director of dentistry who has no connection with the Bureau of Medicine and Surgery under the Surgeon General?

Dr. MEAD. No, sir.

The CHAIRMAN. How close, then, does the Surgeon General have control?

Dr. MEAD. He has the same control he has now, absolutely. It is like this; here is a very easy way to explain it: You have in every state of the Union, in practically every state, dental schools, and you have a president

of the university. He is in the position of the Surgeon General. You have a dental school and you have a medical school; they do not have anything to do with each other's schools, but the president of the university can control either one or both of those schools.

The CHAIRMAN. But, at the same time, that divorcement is so complete that you would run your establishment, your Dental Corps—

Dr. MEAD. Under the Surgeon General's jurisdiction.

The CHAIRMAN. But you do not have to go through the Medical Department of the Surgeon General?

Dr. MEAD. Yes; that is, the Surgeon General is the head of the Medical Department.

The CHAIRMAN. You already have a separate corps, do you not?

Dr. MEAD. Let us put it this way—

The CHAIRMAN. Have you got a separate corps?

Dr. MEAD. There is a separate corps; yes, sir.

The CHAIRMAN. Then you are asking by this bill that that separate corps be divorced from the Bureau of Medicine and Surgery, to a certain extent.

Dr. MEAD. No, sir; we do not ask that.

The CHAIRMAN. Then what do you ask?

Dr. MEAD. We ask that the Dental Corps be made a separate department, the same as medicine is a separate department under the Bureau of Medicine and Surgery, under the direction of the Surgeon General. The kick is not there, on the Surgeon General's office, but the way it is done is where all the trouble lies. I explained about Bethesda; that is the ideal set-up. You have the thing at Bethesda that we are asking for: you have a dental department that can control their dentistry; but if you did not have that separate dental department at Bethesda, the dental man would have to go to the medical officer above him before he could get to the commanding officer. The commanding officer at the Medical Center is a medical man. There is no objection to the dentists going to the medical man, if he is the commanding officer, but they want to carry their problems to the commanding officer who is in a position to determine whether their claims are just.

The CHAIRMAN. Under your bill, the Dental Corps would not be an integral department of the health organization of the Bureau of Medicine and Surgery.

Dr. MEAD. Why not; what is the difference? They would absolutely be. There is nothing in this bill that takes it out. Dentistry is a definite part of the health service in civil life, as well as in the Service.

The CHAIRMAN. Why is this correct: "In the opinion of the Navy Department, the enactment of the bill would result in no improvement in the service of the Dental Corps of the Navy?"

Dr. MEAD. That is not true.

The CHAIRMAN. "The Dental Corps should be an integral part of the health organization of the Navy and, as such, should function as a division of the Medical Department. To establish the Dental Corps as a separate department would call for a complete duplication of the matériel organization and would require the building up of a separate section of the Hospital Corps, whose members would operate in a very narrow and limited field."

Why are not those facts correct?

Dr. MEAD. We feel those facts are not true.

The CHAIRMAN. All right; point out now, first, the improvement of your plan over the present plan.

Dr. MEAD. If you will be kind enough—you have the objections of the Medical Department, which is the Navy Department's objections to this bill——

The CHAIRMAN. It is the Navy Department's objections.

Dr. MEAD. If you will be kind enough, point out to me the paragraph you are interested in, in the objections.

The CHAIRMAN. I am reading the second paragraph:

> It is the opinion of the Navy Department that the enactment of the bill would result in no improvement in the service of the Dental Corps of the Navy.

Now, you sought to explain how you think it would be an improvement. They say:

> The Dental Corps should be an integral part of the health organization of the Navy and, as such, should function as a division of the Medical Department. To establish the Dental Corps—

Mr. MOTT. Let him answer that, first.

Dr. MEAD. Let me answer that. Let us take it in civil life: In civil life, we have dentists and we have physicians. Dentistry is a part of the health service, but it is not a part of the medical department. You do not go to a physician to find out whether the dentist can do some work for you; you go direct to the dentist. There is no reason on earth why there should not be the same relation between medicine and dentistry in the Service that there is in civil life. That is a self-evident improvement.

The CHAIRMAN (reading):

> The establishment of a Dental Corps as a separate department would call for a complete duplication of the matériel organization and require the building up of a separate section of the Hospital Corps, whose members would operate in a very narrow and limited field.

Dr. MEAD. What is the ground for that, Mr. Chairman?

The CHAIRMAN. I would say this, that you would be so specialized that you would be only operating in a narrow and limited field.

Dr. MEAD. That is not true, Mr. Chairman. At the present time, that pertains to these enlisted men taken in as technicians, and these technicians are now under the Medical Department and can be used as pharmacist's mates and hospital clerks, and so forth. A man who is trained as a dental assistant certainly has more ability as a dental assistant than he does as a hospital assistant or pharmacist's mate.

(To be continued in next issue)

CURRENT LITERATURE

Clinical Manifestation of Vitamin Deficiencies as Observed in the Federated Malay States

PAUL FASAL

A SURVEY by the Institute for Medical Research in the Federated Malay States was made of 6,000 Tamilians and 4,000 young adults. Vitamin deficiencies were manifested as phrynoderma, Bitot spots and angular stomatitis. Phrynoderma and Bitot spots responded to vitamin A or carotene therapy, although, in some cases, improvement was not apparent until the protein and vitamin B complex content of the diet had been increased. Angular stomatitis was improved by the administration of riboflavin or the B complex. A supplementary food ration of, say beans, skim milk powder, dal (split pea) and red palm oil, given to Tamilian children improved the general health and led to a rapid regression of the manifestations of vitamin deficiency.—*Arch. Derm. & Syph.*, 50:160-166, September 1944.

Experimental Investigations of Parodontal Disease: Significance of the Blood Supply in Gingival Health and Disease of the Ferret

J. D. KING

VARYING degrees of parodontal disease have been found in the mouths of ferrets. Disturbances ranged from slight infection of the gum margin to pocket formation, hypertrophy, ulceration, atrophy of the gingiva and loss of alveolar bone. Calculus deposits were common. Alterations in the form and distribution of the normal gingival blood supply were studied by histologic procedures and direct capillary microscopy. Although specific etiologic factors have not been identified, dietary conditions and calculus deposits may be important. There is no evidence that an infective agency is responsible. Histologically, there was "less of the keratinous layer of the surface epithelium in the region of the gingival crest," dilatation of capillaries, proliferation of epithelial papillae and leukocytic infiltration of the corium. From evidence obtained by direct microscopic observations on the ferret gingivae, the author suggests that direct clinical microscopy may be of value in gingival examinations in man and in providing more exact diagnostic criteria for early parodontal disease.—*Brit. D. J.*, 77:213-221, October; 245-254, November 1944.

Contact Testing of the Buccal Mucous Membrane for Stomatitis Venenata

L. GOLDMAN and B. GOLDMAN

A PRACTICAL method of contact testing the mucous membranes of the mouth is achieved by ligating a small rubber suction cup to the teeth. The material to be tested is placed on cotton packed in the cup. The average contact time is twenty to thirty minutes, but longer periods may be used. It has been shown that persons sensitive to nickel may have a hypersensitive buccal mucosa. This is an important consideration, as many metallic denture alloys contain nickel or cobalt.—*Arch. Derm. & Syph.*, 50:79-84, August 1944.

Pulp Reactions to Dental Cements

E. B. MANLEY

CONTACT with dental cements prepared with phosphoric acid may have a severe localized reaction in the pulp within twenty-four hours. Contact with zinc phosphate cements has a less intense reaction than contact with copper phosphate or silicate or germicidal cements. To prevent pulp involvement, especially in young subjects, some modification of clinical procedure is indicated: (1) minimum extension into sound dentin after removal of carious dentin and (2) the use of a thin smear of thick zinc oxide-eugenol paste as a sublining.—*D. Rec.*, 64:75, April 1944.

Mottled Enamel, M-Hypoplasia and Dental Caries

J. D. KING

BY clinical investigation, the incidence and relationship of enamel mottling, hypoplasia and dental caries in children from parts of

Essex, Oxfordshire and Suffolk were determined. In general, children drinking water containing relatively high amounts of fluorine showed more mottling and less caries and hypoplasia. (Mellanby.) As to individual teeth, no inverse correlation between mottling and caries could be determined. A positive association was found between caries and hypoplasia (M).—*D. Rec.*, 64:102, May 1944.

Incidence of Periodontal Disease in the Punjab

C. O. M. DAY and K. L. SCHOURIE

BOTH gingivitis and pyorrhea were commonly found in hospital patients, police constables and school children in Lahore. The incidence of gingivitis decreased with age, while that of pyorrhea increased. Pyorrhea appears to be a later stage of gingivitis. The incidence of disease was similar in both sexes, except in the 21-30 year group. In this group, women were less affected. The incidence was similar in vegetarians and nonvegetarians.—*Indian J. M. Res.*, 32:47, May 1944.

PAUL H. KEYES.

Penicillin in Pulp Canal Therapy

FRED R. ADAMS

THE author reported twelve cases in which penicillin was employed for the treatment of root canals. He used a solution of 25,000 units in 5 cc. of distilled water, depositing the desired amount of the solution by means of a 27-gage needle of sufficient length. About 2 cc. of the solution was deposited and sealed in the canal at each treatment. The treatments were given daily when possible. Only when two consecutively negative specimens were obtained were the canals permanently filled. The author states that any chemical used for root canal therapy must be relatively nontoxic and nonirritating. Both penicillin and sulfanilamide possess these properties and are suitable therapeutic agents. Penicillin holds certain advantages over sulfanilamide for pulp canal therapy. —*D. Items Int.*, 66:1147, December 1944.

Thermal Stimuli in Operative Dentistry

MILTON B. ENGEL

PAIN in operative dentistry is probably more frequently induced by the frictional heat of the revolving cutting or grinding instrument than by any other single condition. It has been estimated that there may be a rise in temperature from 67.5 to 270 F. at the point of contact of the instrument with the tooth. The author used a stream of water from an atomizer bottle sprayed directly on the point of contact of the instrument with the tooth to reduce the incidence of pain resulting from thermal shock. An estimated pressure of from 15 to 25 pounds per square inch was recommended to prevent accumulation of water in the cavity. The water was removed from the mouth by the saliva ejector. In addition to reducing thermal pain, this method is also effective in washing the tooth grindings from the cutting surfaces of the instruments. —*U. S. Naval M. Bull.*, 43:502, September 1944.

Surgical Retention of Full Dentures

L. LAKNER

IF the usual means of retention of full dentures is inadequate, surgical treatment of the alveolar ridges may be necessary to establish the proper conditions for denture retention. The author describes a method whereby the denture is fixed onto the alveolar ridge by bolts. Canals are drilled through the jaw, in positions corresponding to those of the cuspids, by means of large sized fissure burs, and allowed to be lined by the oral mucous membrane. The dentures are then constructed with appropriate holes opposite the canals for the insertion of the removable bolts for fixing the denture to the ridge.—*D. Rec.*, 64:277, December 1944.

Dermatitis Following the Local Application of Sulfanilamide

B. FISCHER

A LARGE number of patients with lesions such as minor burns, abrasions, lacerations, furuncles and various types of ulcers, when treated locally with sulfanilamide powder or ointment, exhibited adverse reactions in the form of skin lesions. An investigation was conducted on twelve patients who were suffering from local or general dermatitis, apparently caused by contact with sulfanilamide powder or ointment, in order

to establish the importance of sulfanilamide preparations in the causation of these lesions. Four aspects of the condition were studied: (1) the history of the patient, (2) the appearance of the skin lesion, (3) the reaction to a skin test and (4) reactions to the oral administration of sulfanilamide. The results of these investigations indicated clearly that the skin lesions were the result of sensitivity to the drug arising from previous local treatments. The author recommended (1) that applications containing sulfanilamide not be used for skin conditions except when indicated with certainty; (2) that when such applications are used, the patient be carefully watched by the medical officer, and the treated area be inspected every day for signs of adverse reactions, and (3) that when a local or general reaction occurs, the use of the sulfanilamide preparation be discontinued immediately.—*M. J. Australia,* 2:449, October 1944.

S. W. LEUNG.

Dental Status of Midshipmen

J. M. DUNNING

DENTAL records of 1,208 midshipmen (average age 21.6 years) at the USNR Midshipmen's School, Columbia University, were compiled by five dental examiners, using mirror and explorer. The group showed an average life caries experience, but low tooth mortality rate as compared with that of other groups in this country. The low tooth mortality may probably be ascribed to good dental care within the group. Regional differences in the incidence of caries were pronounced within the group, a high incidence of caries being found generally in northern latitudes and a low incidence in southern latitudes, particularly the Southwest.—*U. S. Nav. M. Bull.* 43:895, November 1944.

Fluoride Domestic Waters and Systemic Effects: 1. Relation to Bone-Fracture Experience, Height and Weight of High School Boys and Young Selectees of the Armed Forces of the United States

F. J. MCCLURE

A STUDY was made of the relation of fluoride in drinking water to bone-fracture experience, height and weight of high school boys and young men. Among high school boys, the number of fractures per hundred boys varied from 21.3 to 32.4. The number of fractured arms and legs per hundred boys varied from 14.0 to 18.5. The latter fractures accounted for about 60 per cent of all fractures. There was no relationship between fracture experience and fluoride exposure. The average height and body weight of all the boys compared favorably with other height-weight data and accepted standards. The height-weight data were not related to fluoride exposures.

The bone-fracture experience of young men who were taking the physical examination at armed forces induction centers varied from about 25.0 to 30.0 fractures per hundred men, averaging about 18 to 25 years of age. An experience of more than one fracture varied from 1.7 to 4.8 per hundred men. While these data on bone-fracture experience for both men and boys of these ages do not permit final conclusions, they do suggest strongly that no serious impairment in skeletal performance, as might be manifested by the number of broken bones, seems to result from exposure to fluoride domestic waters of the concentrations studied in this survey. Figures given for men from Texas, Oklahoma, Indiana, Washington, D. C. and New Hampshire showed no relationship between height-weight and fluoride exposure.—*Pub. Health Rep.,* 59:1543, December 1, 1944.

Deposition of Calcium, Phosphorus and Carbon Dioxide in Calcifying Dental Enamel

M. DEAKINS and R. L. BURT

FROM 5 to 20 mg. samples of developing pig enamel at various stages of calcification were removed from unerupted molar teeth. The samples were weighed on the microbalance and the specific gravity of each was determined. Forty-eight samples were analyzed for carbonate. Thirty-one samples were selected at random from these and analyzed for calcium and phosphorus. Specific gravity was used as a measure of the degree of calcification and was plotted against the results of the microchemical analyses expressed in milligrams per cubic millimeter.

The calcium, phosphorus and carbon dioxide contents were found to increase linearly and in constant ratio to each other throughout the range of calcification; that it, from the lowest to the highest degrees of calcification. This constancy is contrasted with the variations in bone found by other workers. It is concluded that these elements are deposited as a complex compound having a fixed composition. Their atomic ratios do not fit the formula for hydroxyapatite or carbonate apatite.

The variable composition of bone usually reported may be the result of histologic changes with age rather than a change in the fundamental process of calcification. This suggests that enamel, which is histologically homogeneous and unaffected by growth or resorption, may offer advantages over bone in a study of the calcification process.

The Warburg apparatus was used to determine the amount of carbon dioxide in 5 to 10 mg. samples of tissue.—*J. Biol. Chem.*, **156**:77, November, 1944.

Relation of the Blood Level of Ascorbic Acid to the Tissue Concentrations of This Vitamin and to the Histology of the Incisor Teeth in the Guinea-Pig

C. A. KEUTHER, I. R. TELFORD and J. H. ROE

SIXTY-SIX guinea pigs, thirty-three males and thirty-three females, with initial weights ranging from 188 to 517 gm., were maintained for ten days on rabbit chow plus cabbage. They were then transferred to a basal diet low in vitamin C (28 mg./kg.) to which varying amounts of ascorbic acid, ranging from 0 to 600 mg./kg., had been added. The average time for each of the test diets ranged from twenty-six to thirty-eight days, except for one group. A number of tissues were analyzed for ascorbic acid. The most efficient rate of withdrawal of ascorbic acid from the blood by liver, spleen, kidney, adrenal gland, brain, skeletal muscle and cardiac muscle occurs at a whole blood concentration of this vitamin of about 0.25 mg. per hundred milliliters. A level above 0.22 mg./100 ml. of whole blood will prevent the appearance of any pathologic lesions in the incisor teeth of the guinea-pig. Incisal changes are evident both in the calcified structures and in the parenchymal cells of the tooth. Of the latter, the odontoblasts are the most sensitive. With ascorbic acid blood levels below 0.15 mg. per hundred milliliters, these cells are competely degenerated. The ameloblasts are less sensitive and show degeneration only in the most severe scurvy. These studies showed clearly that the tooth is a good biologic indicator of the nutritional status of the animal with respect to vitamin C. Conventional methods of determining the presence of scurvy, such as hemorrhage, reduced growth rate or loosening of the teeth, are too inaccurate and insensitive to be of any value in detecting a mild ascorbic acid deficiency. The data indicated that the vitamin C requirement of the guinea-pig is higher than that of man. It is suggested that determination of the ascorbic acid content of the whole blood is the best procedure for evaluating this aspect of the nutritional status of the animal.—*J. Nutrition*, **28**:347, November 1944.

Diamond Points and the Discard Rate of Steel Dental Burs

HENRY KLEIN

WHEN diamond points were used in conjunction with steel burs for excavating cavities, the discard rate for steel burs was reduced to one-seventh of what it was when steel burs were used alone without diamond points. This significant saving of burs occurred within the relatively short period of approximately one month. The diamond burs were not used up and were still in good condition at the end of the experiment.—*Pub. Health Rep.*, **59**:1021, August 4, 1944.

J. E. GILDA.

CALENDAR OF MEETINGS

National

American Association of Industrial Dentists, Chicago, April 23-28. Ernest Goldhorn, 11001 S. Cottage Grove Ave., Chicago 28, President.

American Association of Orthodontists, Colorado Springs, May 21-24. Max E. Ernst, 1250 Lowry Medical Arts Bldg., St. Paul 2, Secretary. (Canceled.)

American Board of Orthodontics, Colorado Springs, May 17-20. Bernard G. de Vries, 705 Medical Arts Bldg., Minneapolis, Secretary. (Canceled.)

American Society for the Advancement of General Anesthesia in Dentistry, New York, March 26. M. Hillel Feldman, 730 Fifth Ave., New York, Secretary.

National Board of Dental Examiners, April 23-24, in schools where there are five or more candidates. Gordon L. Teall, P. O. Box 71, Hiawatha, Kan., Secretary.

State

Connecticut: State Dental Association, Bridgeport, May 2-4. Earle S. Arnold, Secretary.

Delaware: State Board of Dental Examiners, June 20-22. Charles R. Jefferis, Medical Arts Bldg., Wilmington, Secretary.

District of Columbia: Dental Society, Washington, second Tuesday of each month. J. Walter Bernhard, 1835 Eye St., N.W., Washington, Secretary.

Florida: State Board of Dental Examiners, Jacksonville, June 18-21. A. W. Kellner, P. O. Box 155, Hollywood, Secretary.

Georgia: Thomas P. Hinman Midwinter Clinic, Atlanta, March 25-27. S. A. Garrett, Medical Arts Bldg., Atlanta, Chairman.

Illinois: State Dental Society, Peoria, May 7-10. L. H. Jacob, Jefferson Bldg., Peoria 2, Secretary.

Iowa: State Board of Dental Examiners, Iowa City, June 11-15. Harry G. Bolks, Sioux City, Secretary.

State Dental Society, Des Moines, May 7-9. A. N. Humiston, Higley Bldg., Cedar Rapids, Secretary. (Canceled.)

Kentucky: State Board of Dental Examiners, Louisville, June 19-22. W. F. Waltz, First National Bank Bldg., Lexington 3, Secretary.

State Dental Association, Louisville, April 2-4. J. L. Walker, 640 Barbee Way South, Louisville, Secretary.

Louisiana: State Dental Society, New Orleans, April 24-26. F. Harold Wirth, Maison Blanche Bldg., New Orleans 16, General Chairman.

Maine: Board of Dental Examiners of State of, Augusta, June 18-20. Carl W. Maxfield, 31 Central St., Bangor, Secretary.

Dental Society, Portland, June 14-16. Alonzo H. Garcelon, Division of Dental Health, Augusta, Secretary.

Maryland: State Dental Association, Baltimore, May 7-8. Paul A. Deems, 835 Park Ave., Baltimore 1, Secretary.

Massachusetts: Dental Society, Boston, April 30-May 3. Evelyn F. Eaton, 106 Marlborough St., Boston, Executive Secretary.

Michigan: State Dental Society, Detroit, April 16-18. S. G. Applegate, 630 Jefferson Ave., Detroit, General Chairman.

Mississippi: Dental Association, Jackson, May 6-8. O. L. Colee, Magnolia, Secretary.

Missouri: State Dental Society, St. Louis, May 14-16. C. W. Diggs, Exchange National Bank Bldg., Columbia.

New Jersey: State Board of Registration and Examination in Dentistry, April 23-26. J. Frank Burke, 150 E. State St., Trenton, Acting Secretary.

State Dental Society, Atlantic City, May 8-11. F. K. Heazelton, 223 E. Hanover St., Trenton, Secretary. (Canceled.)

New York: Institute of Clinical Oral Pathology, Inc., New York, April 30. G. Roistacher, 101 E. 79th St., New York 21, Executive Secretary.

Society of Orthodontists, New York, March 5-6. Norman L. Hillyer, Professional Bldg., Hempstead, Secretary. (Canceled.)

Women's Dental Society of, New York, March 21. Anna C. Johnson, 745 St. Nicholas Ave., New York 31.

North Carolina: Dental Society, Pinehurst, May 7-9. C. W. Sanders, Benson, Secretary.

State Board of Dental Examiners, Raleigh, June 25. Wilbert Jackson, Rich Bldg., Clinton, Secretary.

North Dakota: State Board of Dental Examiners, Fargo, July 9-12. Richard Krause, Bismarck, Secretary.

Ohio: Cleveland Dental Society, May 7-9. Homer C. Alexander, Windermere Theatre Bldg., East Cleveland, Program Chairman.

State Dental Board, Cleveland, May 21-23; Columbus, June 4-6, 7-9. Hygienists, June 5, 7-9. Earl D. Lowry, 79 E. State St., Columbus, Secretary.

Oklahoma: State Dental Society, Oklahoma City, April 15-18. E. W. Wise, Secretary.

Pennsylvania: Dental Council and Examining Board of Commonwealth of, Philadelphia, April 16-21. Reuben E. V. Miller, Secretary.

State Dental Society, Philadelphia, May 1-3. C. J. Hollister, 217 State St., Harrisburg, Executive Secretary.

South Carolina: State Dental Association, Columbia, April 22-24. C. M. Douglas, State Hospital, Columbia, President.

South Dakota: State Dental Society, Watertown, May 13-15. Ernest W. Elmen, Sioux Falls, Secretary.

Tennessee: Board of Dental Examiners, Memphis, June 18-22. James J. Vaughn, Medical Arts Bldg., Nashville, Secretary.

State Dental Association, Knoxville, May 14-17. E. Jeff Justis, Exchange Bldg., Memphis 3, Secretary.

Vermont: State Board of Dental Examiners, Montpelier, June 25-27. Charles I. Taggart, 139 Bank St., Burlington, Secretary.

State Dental Society, Burlington, May 23-24.

Virginia: State Dental Association, Roanoke, April 23-25. J. E. John, Medical Arts Bldg., Roanoke, Secretary.

Washington: State Dental Association, Spokane, June 21-23. G. D. Williams, Paulsen Bldg., Spokane, President.

West Virginia: State Board of Dental Examiners, West Liberty, June 25-27. R. H. Davis, Goff Bldg., Clarksburg, Secretary.

State Dental Society, Charleston, May 21-23. M. H. Nicholson, Bluefield, Secretary.

Wisconsin: State Dental Society, March 19-21. (Canceled.)

INTERNSHIPS, EXTERNSHIPS, RESIDENCIES AND FELLOWSHIPS

Bronx Hospital, Dental Department, New York. Director, S. Burton Gerstner, Fulton Ave. at 169th St., Bronx 56, N. Y.

Eastman Dental Dispensary, Rochester, N. Y. Director, Harvey J. Burkhardt, 800 Main St., East P. O. Box 879, Rochester 3, N. Y.

Greater New York Conference of Hospital Dental Services. Secretary, Mary E. Reilly, 386 Fourth Ave., New York.

Research and Educational Hospital, University of Illinois Medical Center. Address Dean, University of Illinois, College of Dentistry, 808 S. Wood St., Chicago 12.

Walter G. Zoller Memorial Dental Clinic, University of Chicago. Address Director, Walter G. Zoller Memorial Dental Clinic, University of Chicago, Chicago 37.

Carnegie Fellowships for Research and Graduate Work in the Dental Sciences, University of Rochester. George H. Whipple, Rochester, Dean.

Pathology, Dental and Oral, Fellowship in, Army Institute of Pathology. Address Director, Army Institute of Pathology, Army Medical Museum, 7th and Independence, S.W., Washington 25, D. C.

Research Fellowships in Medicine, Dentistry and Pharmacy, University of Illinois. Address Secretary of Committee on Graduate Work in Medicine, Dentistry and Pharmacy, 1853 W. Polk St., Chicago 12.

AMERICAN DENTAL ASSOCIATION

OFFICERS

Walter H. Scherer, President.....Medical Arts Bldg., Houston, Texas
Sterling V. Mead, President Elect.....1149-16th St., N.W., Washington, D. C.
Herbert E. King, First Vice President.....Medical Arts Bldg., Omaha, Nebr.
W. I. McNeil, Second Vice President.....1757 W. Harrison St., Chicago, Ill.
E. M. Clifford, Third Vice President.....57 Pratt St., Hartford, Conn.
Harry B. Pinney, Secretary.....222 E. Superior St., Chicago, Ill.
R. H. Volland, Treasurer.....First Capital Nat'l Bank Bldg., Iowa City, Iowa

BOARD OF TRUSTEES

LeRoy M. Ennis, 1947, Third District.....4001 Spruce St., Philadelphia, Pa.
Harold W. Oppice, 1947, Eighth District.....1002 W. Wilson St., Chicago, Ill.
C. J. Wright, 1947, Ninth District.....American State Bank Bldg., Lansing, Mich.
Edward J. Jennings, 1947, Fourth District.....126 W. State St., Trenton, N. J.
Clyde E. Minges, 1947, Fifth District.....Peoples Bank Bldg., Rocky Mount, N. C.
Carlos H. Schott, 1947, Seventh District.....Neave Bldg., Cincinnati, Ohio
H. B. Washburn, 1946, Tenth District.....Lowry Bldg., St. Paul, Minn.
Howard E. Summers, 1946, Sixth District.....First Nat'l Bank Bldg., Huntington, W. Va.
Henry Hicks, 1946, First District.....5 Glen Court, Greenwich, Conn.
Harvey J. Burkhardt, 1945, Second District.....800 Main St., East Box 879, Rochester, N. Y.
Fred J. Wolfe, 1945, Twelfth District.....Maison Blanche Bldg., New Orleans, La.
Russell A. Sand, 1945, Eleventh District.....807 N. Broadway, Fargo, N. D.
D. W. McLean, 1945, Thirteenth District.....2585 Huntington Drive, San Marino, Calif.

SECTION CHAIRMEN

OPERATIVE DENTISTRY, MATERIA MEDICA AND THERAPEUTICS: E. M. Jones, 122 E. 16th St., Los Angeles, Calif.
FULL DENTURE PROSTHESIS: W. W. Hurst, 2165 Adelbert Road, Cleveland, Ohio
PARTIAL DENTURE PROSTHESIS: Oliver C. Applegate, 216 S. State St., Ann Arbor, Mich.
ORAL SURGERY, EXODONTIA AND ANESTHESIA: George W. Christiansen, National Naval Medical Center, Bethesda, Md.
ORTHODONTICS: L. B. Higley, 705 S. Summit St., Iowa City, Iowa
PERIODONTIA: Hunter S. Allen, Comer Bldg., Birmingham, Ala.
DENTISTRY FOR CHILDREN AND ORAL HYGIENE: Kenneth A. Easlick, University of Michigan, Ann Arbor, Mich.
HISTOLOGY, PHYSIOLOGY, PATHOLOGY, BACTERIOLOGY AND CHEMISTRY (RESEARCH): Hermann Becks, University of California, San Francisco, Calif.
PRACTICE MANAGEMENT: Gaylord J. James, 9400 Euclid Ave., Cleveland, Ohio
RADIOLOGY: H. C. Fixott, Medical-Dental Bldg., Portland, Ore.
HOSPITAL DENTAL SERVICE: W. Harry Archer, Professional Bldg., Pittsburgh, Pa.

CHAIRMEN OF STANDING COMMITTEES

JUDICIAL COUNCIL: Ernest G. Sloman, 344-14th St., San Francisco, Calif.
COUNCIL ON DENTAL EDUCATION: William N. Hodgkin, Warrenton, Va.
COUNCIL ON DENTAL HEALTH: Emory W. Morris, Battle Creek, Mich.
DENTAL LEGISLATION: Carl O. Flagstad, 1549 Medical Arts Bldg., Minneapolis, Minn.
RELIEF COMMISSION: Fred R. Adams, 55 W. 42nd St., New York, N. Y.
RESEARCH COMMISSION: M. D. Huff, 1204 Medical Arts Bldg., Atlanta, Ga.
PATENT: M. D. K. Bremner, 25 E. Washington St., Chicago, Ill.
LIBRARY AND INDEXING SERVICE: John E. Gurley, 350 Post St., San Francisco, Calif.
NATIONAL BOARD OF DENTAL EXAMINERS: Robert R. Gillis, 134 Rimbach Ave., Hammond, Ind.
MEMBERSHIP: Paul W. Zillmann, 29 Walden Ave., Buffalo, N. Y.
INSURANCE: A. D. Weakley, 1726 Eye Street, Washington, D. C.
ECONOMICS: Leslie M. FitzGerald, Roshek Bldg., Dubuque, Iowa
COUNCIL ON DENTAL THERAPEUTICS: Harold S. Smith, 180 N. Michigan Blvd., Chicago, Ill.

AMERICAN RED CROSS: George A. Coleman, 15th and Locust Sts., Philadelphia, Pa.
HISTORY: W. Harry Archer, Professional Bldg., Pittsburgh, Pa.
DENTAL MUSEUM: Henry A. Swanson, 1726 Eye St., N. W., Washington, D. C.
NOMENCLATURE COMMITTEE: Harry Lyons, Professional Bldg., Richmond, Va.
CONSTITUTIONAL AND ADMINISTRATIVE BY-LAWS: Percy T. Phillips, 18 E. 48th St., New York, N. Y.
INTERNATIONAL RELATIONS: Daniel F. Lynch, U. S. Naval Hospital, San Diego, Calif.

CHAIRMEN OF SPECIAL COMMITTEES

ARMY AND NAVY: Col. James P. Hollers, Hdq., Army Air Forces, Air Surgeon's Office, Washington, D. C.
GORGAS MEMORIAL: Donald M. Gallie, 25 E. Washington St., Chicago, Ill.
JUNIOR MEMBERSHIP: R. R. Gillis, 134 Rimbach Ave., Hammond, Ind.
LOAN FUND: Henry Hicks, 5 Glen Court, Greenwich, Conn.
MILITARY AFFAIRS: E. C. Lunsford, 2742 Biscayne Blvd., Miami, Fla.
PLAN FOR NATIONAL PUBLICITY: Robert G. Kesel, 808 S. Wood St., Chicago, Ill.
PROSTHETIC DENTAL SERVICE: Waldo H. Mork, 501 Madison Ave., New York, N. Y.
SALVAGE CAMPAIGN: Lloyd N. Harlow, Hall Bldg., St. Petersburg, Fla.
TRADE RELATIONS: Frank J. Hurlstone, 30 N. Michigan Ave., Chicago, Ill.
WAR SERVICE AND POSTWAR PLANNING: C. Willard Camalier, 1726 Eye St., N.W., Washington, D. C.
WOMAN'S AUXILIARY: Stella Risser, Rice Hotel, Houston, Texas

THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION

222 E. Superior St. Chicago 11, Ill.
Phone Whitehall 4462 Cable Address ADAECO

Subscription prices per annum in advance, including postage: Domestic, Canadian and foreign, $5.00. Single copies for present and previous calendar year, 50 cents; copies three years old or older, 75 cents. Copies of Mid-Monthly Issue, 10 cents.

Remittances should be made by check, draft, registered letter or money or express order. Letters containing currency should be registered. Stamps in amounts under $1.00 are acceptable. Make checks payable to the American Dental Association.

Notices of change of address should be received one month before the change is to go into effect. Both old and new address should be given.

Communications. More prompt attention will be given communications concerning more than one subject (manuscript, news items, reprints, change of address, payment of subscription, membership, information wanted, etc.) if a separate sheet is used to cover each subject.

Articles are accepted for publication with the understanding that they have not been published previously and that they are submitted solely to THE JOURNAL.

Copyright. All matter appearing in THE JOURNAL is covered by copyright. Requests for republication in reputable periodicals will be granted, but credit must be given to THE JOURNAL. Reproduction of articles for commercial purposes is not permitted.

Manuscripts must be typewritten, double spaced, and an original copy must be submitted. Paper must be of sufficient weight to bear editing and to stand up on the linotype machine. References should give name, with initials, of author, volume, page, month and year of publication in the case of periodicals, and publisher and place and year of publication in the case of books. Unused manuscripts are returned; used manuscripts are not.

Illustrations must be clear photographs (glossy prints preferred) or drawings in black ink on heavy white paper or cardboard. They should bear the author's name and be numbered in the order in which they are referred to in the text. Illustrations must not be pasted on the manuscript. Tables are text matter, not illustrations, and are to be numbered separately from the illustrations.

News. Readers are requested to send in items of news and marked copies of newspapers and other publications containing matters of interest to the dentist.

Reprint orders are mailed to authors on publication of articles. Orders are filled bimonthly.